THE IRON TRADE REVIEW

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VESSEL ORDERS

AND RAILROAD BUYING IMPROVE MARKET CONDITIONS.

Two Large Freighters Contracted For and Others Will Probably be Built—Pig Iron Quiet—Rather Weak at Pittsburg.

Orders for lake vessels and freight cars which will require about 25,000 tons of plates and shapes, negotiations pending for 10 or 12 other lake vessels, and numerous inquiries for cars have greatly improved the tone of the finished material market. In addition to the large orders placed, specifications on nearly all finished products are coming in satisfactorily. The orders just placed represent a large saving in cost compared with last year's figures.

Vessels and Cars Ordered

The order for two lake vessels, foreshadowed last week, has been placed by the Pittsburg Steamship Co., which is the vessel department of the United States Steel Corporation, with the American Ship Building Co., each vessel requiring about 5,000 tons of steel. The plates will be rolled at the Homestead plant of the Carnegie Steel Co. The ordering of lake vessels during a season of great depression in lake traffic indicates confidence that this year's inactivity will be followed by years of great prosperity. The Chicago & Alton railroad has ordered 1,000 cars, to be built by the Standard Steel Car Co., of Pittsburg, at its Hammond, Ind., plant. The plates will be rolled by the Illinois Steel Co. The Atlantic Coast Line has ordered 500 cars from the South Baltimore Steel Car & Foundry Co., and the Harriman lines have awarded a contract for 10,000 tons of structural material to the American Bridge Co. It is expected that other western roads will contract for between 40,000 and 50,000 tons at an early date. A few inquiries for standard section steel rails are pending from electric lines, but no important orders from either electric or steam railroads are reported. It is probable that books will soon be opened for orders for 1909.

Pig Iron Conditions

With the exception of some activity in the East, including the Buffalo district, the pig iron market has been very quiet, and in the Pittsburg district there is a tendency toward weakness. In the South, several leading interests have advanced their quotations to $13 Birmingham, and are practically out of the market, in which $12.50 can still be done. The demand for malleable has improved somewhat, especially in New York and New England. A Northwestern Pennsylvania interest has closed for 5,000 tons of malleable for extended deliveries. Steel making iron is in light demand in the Pittsburg district, and quotations are somewhat lower. The very fair volume of business in pig iron transacted during the late summer has improved the position of the seller, and the market is not so one-sided as it was a few months ago. Many pig iron producers are not inclined to press their output on the market.

Coke and Old Material

The production of coke in the Connellsville region has increased until the leading interest is operating 60 per cent of its oven capacity. Owing to the strike of coal miners in Alabama, there is a heavy movement of Virginia coke to Alabama furnaces. Dealers in old material, particularly in Chicago, are apparently preparing for an advance of prices, but it is doubtful whether their plans can be successfully carried out.

RAILROAD BUYING

Promises to Increase Rapidly, Following Recent Sales.

(Special Telegram.)

New York, Aug. 26.—Railroad buying shows good increase. The placing of the Alton order for 1,000 steel cars is believed to be the first of the heavy purchasing. Rail sales by the leading interest total 4,500 tons, of which 2,000 goes to a frog and switch concern. Bolt and nut interests report more active buying, with prospect of early advance in prices. The market is now an open one, but a meeting of manufacturers is being held in New York today.

Good sales of light rails are reported. General export trade active and there is continued heavy selling of steel bars.

Harriman lines have specified on 4,000 tons additional bridge materials with the American Bridge Co. This is practically a new order. The McClintic-Marshall Construction Co. took 1,300 tons for a San Francisco wharf shed.

FURNACES BLOWN IN.

The Genesee furnace of Corrigan, McKinney & Co., at Charlotte, N. Y., has been blown in after the completion of extensive repairs. The Steel Corporation has blown in stack No. 2 at the South Chicago Works, bringing its furnace capacity in operation to nearly 58 per cent.

The Miami Furnace at Hamilton, O., went into blast Aug. 22. The stack has a capacity of 250 tons daily. The first cast was taken out on Sunday. Walter-Wallingford & Co., are agents.

The Irondale furnace of the Irondale Furnace Co., Irondale, Wash., which has been out of blast for some time, is preparing to blow in in September. The stack will use coke most of the time, but will make some charcoal pig.

THE WEEK IN IRON CENTERS

PITTSBURG.

Improvement Not so Pronounced—Pig Iron Market Very Quiet.

Office of THE IRON TRADE REVIEW,
510 Park Building, Aug. 25.

The onward movement in iron and steel lines is less pronounced. The clear improvement that had characterized the entire situation in July the earlier part of August has been less in evidence during the past few weeks. It is not believed, however, that the lull into which the market has apparently entered will be long-lived.

In some lines, particularly sheets, merchant pipe and wire products, material proof of consistent improvement is presented. Billets are also moving in better volume against present contracts. Rails are stationary. Steel bars, structural material, tin plate and consequently tin bars, are less active. Plates are in moderate demand, but there are numerous projects held up in the country which when released will require an immense tonnage of this material.

A favorable feature of the week was the ordering of 1,000 steel cars by the Chicago & Alton railroad. This is the first large contract for cars to be placed in months and it is thought by steel manufacturers that it will exert a salutary influence upon the other roads which are now figuring upon similar equipment.

Blast furnace operations on the part of the steel companies reflect improved conditions in that a greater pig iron tonnage is being required for mill activities. The Carnegie Steel Co. is working 30 of its 55 stacks and will shortly put on several additional furnaces; the National Tube Co. is operating six out of 11 stacks; Jones & Laughlin Steel Co., four out of six stacks and the Republic Iron & Steel Co. three of its six mill stacks, the Hall furnace having been put on last week, in addition to two merchant stacks in the south. The Republic company is not working its steel plant this week, but will start it again next week. For the past several weeks the company has been enabled to operate its works at about 70 per cent of normal.

In coke, the H. C. Frick Coke Co. has about 11,500 coke ovens active, or about 60 per cent of its total capacity. The independent coke interests are working upon about a 40 per cent basis.

Pig Iron.—The movement in pig iron has become sluggish, and the situation lacks both tone and firmness. Sales are light, and the inquiry is less than it has been for weeks. Prices in all grades, with the possible exception of foundry iron, are weak, and the full extent of this sagging quality continues undetermined in the present market of small transactions. While the influence of the month when so many buyers are absent from business has contributed to the dullness, it is evident that the melt generally in this district is showing no marked increase.

Foundry iron continues at $14.50 to $14.75 valley for No. 2, and is steady at this level. The Standard Sanitary Mfg. Co., which of late has been an extensive buyer of foundry iron, materially increased its purchases of northern No. 2 during the week, and has now contracted for about 12,500 tons for its three plants. Sales of 2,000 tons of No. 2 in scattering lots over the remainder of the year are reported at $14.75 valley. The amount of foundry iron under negotiation is not large. Steel making iron is in light demand. Bessemer iron has declined until $15.25 valley or $16.15 Pittsburg has become the generally accepted quotation. Basic is quoted at $14.75 valley with reports that $14.50 may be done on attractive tonnages. A sale of 100 tons brought $14.75 valley. There is a better demand for malleable principally from New York and New England, with the market ruling at $14.75 valley. A northern Pennsylvania interest closed this week for 5,000 tons of malleable for extended deliveries, the iron to be furnished by a nearby furnace. Forge is held at $13.75 valley with no activity apparent.

There is little movement in southern iron, the price of $12.50 Birmingham for No. 2 proving prohibitive. One large interest is asking $13. On third and last quarter shipment on northern iron we quote as follows:

Bessemer, valley	$15.25 to 15.50
Bessemer, Pittsburg	16.15 to 16.40
No. 1 foundry, Pittsburg	15.90 to 16.15
No. 2 foundry, Pittsburg	15.40 to 15.65
Gray forge, Pittsburg	14.65 to 14.90
Basic, valley	14.75 to 15 00
Basic, Pittsburg	15.65 to 15.90

Ferro-Alloys. — Low prices are being made on prompt ferro-manganese, principally by brokers and middle men, $43 seaboard and under being reported. A carload sale was made here this week at about these figures. A local steel company is still in the market for 200 to 300 tons for extended deliveries. Ferro-silicon sales are being made at full prices. For delivery this year, we quote ferro-manganese at from $44 to $44.50 or $45.95 to $46.45 Pittsburg.

Imported 50 per cent ferro-silicon is quoted $69 Pittsburg on forward deliveries; domestic 12 per cent, $29; 11 per cent, $28; 10 per cent, $27. The lower grades of imported ferro-silicon are upon about the same basis. These quotations are applicable to Pittsburg territory.

Plates.—The Chicago & Alton railroad has placed an order for 1,000 steel gondolas with the Standard Steel Car Co., Pittsburg. This is the first steel car order of magnitude placed in months, and it is expected that its effect upon the other roads contemplating such investments will be beneficial to the market. The plates required for these cars, about 10,000 tons, will be rolled at Chicago. Only moderate activity is prevalent in plates. Specifications are out for a water line for the city of Springfield, Mass., which will require about 5,000 tons of plates. Some independents are shading prices, principally upon the lighter gages. We quote:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—A gratifying improvement in sheets is being made from week to week. Jobbers generally throughout the country are displaying a desire to

secure tonnage, and some encouraging stock orders are being placed. Urgent shipping orders are the rule, and the mills are finding some difficulty in complying with all instructions. The American Sheet & Tin Plate Co. this week is working 61 per cent of its capacity, against 60 per cent last week, the gain being in scattering mills. Shading of prices of from $1 to $3 a ton is being done by several of the independents, usually upon prompt business. We quote:

Black steel sheets, one pass, cold rolled, No. 28 gage, $2.50 per 100 pounds, and galvanized sheets, No. 28 gage, $3.55 per 100 pounds, plus the regular extras.

Blue annealed: Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28. Jobbers are allowed $1 a ton from these prices.

Tin Plate.—Production of tin plate has about reached the low ebb, the principal interest operating at about 50 per cent of capacity. This rate of activity is expected to be maintained well into September, as there is considerable unfilled tonnage on mill books. Any change will likely be in the direction of increased capacity. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The present season is that in which the railroads place their rail orders for the ensuing year's delivery, but while estimates as to requirements are now being made, no contracts have been closed. Sufficient standard specifications are being received and the light rail demand is such as to keep the mills of the local maker operating about the same as in the past. The needs of frog and switch interests are increasing. Spike orders are small and are for repair purposes. On present specifications on Bessemer rails we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28, carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—The consumption of billets is increasing and specifications against sliding scale contracts continue to divert the largest tonnage of the present year to the mills. The greater activity appears general in scope. New business is not heavy, but a northern Ohio manufacturer closed this week for 3,000 tons of billets for nearby delivery. Official prices are reported to be strictly observed. The tonnage of sheet and tin bars moving is less than it has been, but it continues quite large.

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

Hoops, Bands and Cotton Ties.—There is little activity in new business in this market. An additional movement of cotton ties is expected in September, when the cotton crop comes in. We quote:

Cotton ties, 85c per bundle Pittsburg, plus the freight on lots of 3,000 bundles or more, and 88c per bundle Pittsburg for less than 3,000 bundle lots.

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

Merchant Bars.—A little lull in specifications has fallen upon the steel bar market, the implement people showing less activity in this respect, although some bar makers report undiminished tonnage moving. The principal consumers are well covered as to their requirements into the next year. In anticipation of a probable increase in prices soon, consumers are taking bar iron in a better volume. Bar iron makers are showing less inclination to sell at present prices. Eastern makers who have been selling down to $1.25 Pittsburg are expected to meet shortly to take some action as to prices. Nut and bolt manufacturers will meet in New York this week to canvass the situation in their line. We quote:

Common iron bars, 1.40c Pittsburg in carload lots and over; 1.45c in less than carloads; 1.32c to 1.35c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3 inches, 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting 56 per cent in carloads, and 52 per cent less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.80c base. Iron finished tire under 1½ by 1½ inches, 1.70c; iron finished tire 1½ by 1½ and over, 1.60c. All tire subject to ½ extra on the steel card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices per 100 pounds, $3.35 on hard, and $3.60 on soft.

Structural Material.—The situation in structural material is less satisfactory, owing to a limited new business being offered and to the low prices being made by fabricators. The situation in this latter respect has grown worse, and more earnest efforts are being made to hold the market firm. The Pittsburg Steel Construction Co. will erect the 10,000 tons of steel for the new Oliver building in this city. The steel will be rolled by the Carnegie Steel Co. and fabricated by the American Bridge Co. Bids have gone in this week for a new county bridge across the Allegheny river at Oakmont, which will require about 2,200 tons. A new rolling mill building which Spang, Chalfant & Co., Inc., will erect at their works at Etna, Pa., will require about 700 tons. We quote:

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from 3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Merchant Pipe.—It is estimated that from 50 to 55 per cent of the normal capacity of pipe mills is being consumed by the trade at present. Some of the mills are operating considerably in excess of this rate, and are putting their surplus into stocks. Jobbers are still reluctant to carry much tonnage in store. The market is consistently active, particularly in line pipe, and some large contracts are being placed by oil, gas and water companies. The inquiry is good. Prices are well maintained, and the sentiment in the market is that, if any change is to come, it will be upward. Shading of iron pipe prices is being done. We quote the following official base discount with an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
¼ to 6 inches....	75	65	73	63

Boiler Tubes.—Although there is increased demand in boiler tubes, the situation is not satisfactory to makers. The railroads are taking large amounts for immediate needs, but the requirements of the boiler makers have not increased.

We quote the following official base discount to the general trade:

BOILER TUBES.

	Iron.	Steel.
2¼ to 5 inch.....	52	65

Wire Products.—There is an active demand for plain wire from the manufacturing trade, and contracts being placed for most wire products are quite heavy for this season of the year. Stocks are not being enlarged, and prompt shipment of material is generally requested. It is reported that slight shading of prices on wire is being done by some manufacturers. We quote:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2.00; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Wire Rods.—The improved tone in wire products is reflected in the increased business being taken in rods. We quote $33 Pittsburg on Bessemer, and $34 Pittsburg on open-hearth rods.

Coke.—The H. C. Frick Coke Co. has increased its activity until it is now operating approximately 11,500 ovens, or about 60 per cent of its total oven capacity. The greater output is being consumed by the increased furnace requirements of the United States Steel Corporation. The independents are working to about 40 per cent of normal. The market is quiet. A New York furnace has closed for its requirements, about 25,000 tons, over the remainder of the year. The implement makers are taking less tonnage on contract. The Connellsville region was visited by rains during the past week and the drouth is now less severe, although water is still being hauled to some operations. We quote standard Connellsville foundry coke at from $2 to $2.25 ovens, and standard Connelsville furnace coke at from $1.65 to $1.85 ovens, lower prices being named for prompt shipment. The *Courier* for the week ending August 15, reports 18,196 ovens active, 19,154 ovens inactive with an output of 193,492 tons compared with 18,152 ovens active, 19,198 ovens inactive and a production of 192,845 tons the previous week.

Old Material.—The old material market has developed into a waiting game between the dealers and the mills. The former are absorbing a large portion of the limited tonnage that is being offered, at prices which the mills appear unwilling to pay, and are holding it for speculation. As a result, the principal consumers in this district are buying for their needs in a hand to mouth style, since they are carrying no stocks. The market is so closely held on some grades that prices are inclined to rise upon the slightest evidence of interest on the part of the mills. This was illustrated this week in the effect upon iron mill scrap produced by some moderate purchases by the Republic Iron & Steel Co. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $14.50 to $15.00; re-rolling rails, $16.00 to $17.00; bundled sheet scrap, $12.00 to $12.50; iron axles, $20.50 to $21.00; old iron rails, $17.00 to $18.00; No. 1 wrought scrap, $15.50 to $16.00; old car wheels, $14.50 to $15.00; low phosphorus, $18.00 to $18.50; machine shop turnings, $9.25 to $9.75; cast borings, $8.50 to $9.00; No. 1 cast scrap, $14.00 to $14.50; malleable, $14.00.

CHICAGO.

Large Contracts For Plates and Shapes—Pig Iron Market Dull.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Aug. 25.

Two large orders for structurals and plates placed within the past week has given a decidedly better tone to the finished material end of the market. These contracts include 10,000 tons from the Harriman lines, awarded to the American Bridge Co., and 10,000 tons let to the Illinois Steel Co. by the Standard Steel Car Works, of Hammond, Ind. The latter material is to enter into the construction of the 1,000 steel gondola cars ordered by the Chicago and Alton railway. Negotiations are also in progress with three other western roads for between 40,000 and 50,000 tons, and now that the Harriman order is let, it is expected that these other contracts will be closed within a few days. Orders have also been placed this past week for about 3,500 tons of cast iron pipe, and inquiries from western irrigation enterprises are pending for a further round tonnage. There is a healthy activity in all forms of material entering into agricultural consumption, the specifications for steel bars being so voluminous that at least one western mill is not keeping pace with its customers' requirements. Light rails are also in good demand, especially from mining and lumber companies, the Illinois Steel Co. reporting a greater volume of business in this product during August than in any preceding month this year. Nothing of importance in standard rails has developed, but it is possible that mills will open their books for 1909 within the near future. Sheets are quiet, and so is wrought pipe, mixed orders for both these products being the rule rather than the exception. Scrap is strong in tone, but in light demand, with the market showing a tendency to advance.

Pig Iron.—This is a drifting market. Inquiries are light and orders are fewer. Prices seem satisfactory enough, the dullness being attributed to the over-bought condition of western foundries. The demand for castings, especially steel and malleable, and the larger sizes of gray iron, has not improved in proportion to the development in other lines of business; and in the present demand upon their resources, foundries feel their present pig iron contracts are sufficient for current needs. Furthermore, the southern furnaces are none too anxious to sell additional tonnage at existing prices, and are content to let the market alone, confident it can drift in but one direction, and that upward. Most of them have disposed of their third quarter output and have a comfortable tonnage for the fourth quarter also on their books, and under the circumstances are not feeling any anxiety over present conditions. There will be little further movement in southern iron until the northern stacks have taken some tonnage. Just now their order books are light, and as long as they continue to maintain the $17 schedule, the market will remain in their favor. It will also prevent the southern stacks from advancing their schedules, which remain nominally at $12.50 Birmingham for No. 2. The Sloss, Republic and Tennessee interests, however, are out of the market, and on all inquiries, except the most desirable, $13 is the quotation returned. In fact, a few carloads have been sold at this figure. Our quotations continue as follows, the basis being Chicago delivery:

Lake Superior Charcoal.....	$19.50 to 20.00
Northern Foundry No. 1.....	17.50 to 18.00
Northern Foundry No. 2.....	17.00 to 17.50
Northern Foundry No. 3.....	16.50 to 17.00
Southern Foundry No. 1.....	17.35 to 17.85
Southern Foundry No. 2.....	16.85 to 17.35
Southern Foundry No. 3.....	16.35 to 16.85
Southern Foundry No. 4.....	15.85 to 16.35
Southern No. 1 Soft.....	17.35 to 17.85
Southern No. 2 Soft.....	16.85 to 17.35
Southern Gray Forge	15.60 to 16.10
Southern Mottled	15.35 to 15.60
Southern Silveries, 4 per cent Silicon	18.85 to 19.35
Southern Silveries, 5 per cent Silicon	19.35 to 19.85
Southern Silveries, 6 per cent Silicon	19.85 to 20.35
Jackson Co. Silveries, 6 per cent	19.90 to 20.40
Jackson Co. Silveries, 8 per cent	20.90 to 21.40
Jackson Co. Silveries, 10 per cent	21.90 to 22.40
Malleable Bessemer	17.25 to 17.75
Standard Bessemer	18.25 to 18.75
Alabama Basic	16.85 to 17.35

Rods and Billets.—The only notable transaction involving billet steel is the purchase last week by the Chicago & Alton railway of 1,000 steel cars which will be constructed at Hammond, Ind. The Illinois Steel Co. secured the contract for all the raw material, which includes about 1,000 tons of axle billets. Routine trade is of about the same proportions as former-

ly, and prices are without any change. We quote 4 x 4 inch rolling billets, $26.50 and forging billets, $28.50 base Chicago. Bessemer wire rods, $33; open-hearth, $35; chain rods, $33, all f. o. b. Pittsburg.

Merchant Bars.—Nothing has developed either to mar or improve the good conditions existing in the bar trade. Steel mills are very generally operating to their full capacity, in some instances falling slightly behind in their shipments, while the iron trade shows a healthy activity with conditions tending towards improvement all the time. Active buying for soft steel shapes is pretty nearly over, and the interest of consumers and producers is now centered upon the securing and shipment of specifications. The volume of these continue surprisingly large and embrace the entire range of agricultural shapes. Bar iron mills have felt the stimulus of crop prospects, and the specifications from railroads and car builders keep up. There is a good sized tonnage going into miscellaneous avenues of consumption, particularly fire escapes and that class of work, and this business has been especially welcome and active in the late dull times. Hard steel angles are not moving very rapidly, but are without change in price at 1.48c Chicago. We quote other materials, Chicago delivery, as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch, 1.73c base tire card; iron finish, 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1-inch, 2.08c, and 1⅛-inch and larger, 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.05c; toe calk steel, 2.13c; railway spring, 1.93c, base steel card; vehicle spring steel, 1.98c base, vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

Plates.—The order to furnish the raw material for the 1,000 steel cars to be built for the Chicago and Alton railway went to the Illinois Steel Co. The tonnage involved is about 10,000 tons. The company's plate mill at South Chicago is at present idle, but it will be started up again in a few days. Mill specifications from the regular trade channels have not been active in the past week, although the movement from jobbers' warehouses shows no diminution. We quote as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.78c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 to 96 inches wide, 2.10c to 2.20c; 3/16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 2.15c. Flange and head quality, 25c extra.

Sheets.—The sheet market enjoys a good tone, the strong demand for the lighter gages offsetting the light movement in the heavier sizes. Prices appear to be mell maintained, although the ease with which quick shipments from mills can be obtained occasionally gives rise to rumors of concessions. Jobbers are moving their stocks as well as can be desired; in the meantime, however, maintaining them as low as is consistent with present business conditions. We quote store prices, Chicago delivery, below. For mill prices, see Pittsburg report:

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, No. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—Odds and ends and small tonnages generally comprise the bulk of the week's events. The one notable and redeeming exception is the blanket contract placed with the American Bridge Co., by the Harriman lines for a minimum of 10,000 tons of fabricated steel shapes to be used as specified during the ensuing 12 months. Negotiations have also been opened with the Chicago & Northwestern, Milwaukee and St. Paul and Santa Fe railways for their annual contracts of a similar nature, and it is expected that these roads in the near future will contract for an aggregate of 40,000 to 50,000 tons. The requirements for the Chicago & Alton cars, noted elsewhere in this report, adds another substantial tonnage to the week's sales. We quote as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.78c to 1.81c delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds, base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—It is possible that within the early future rail mills will announce the opening of their books for 1909 contracts. As yet, not a ton has been booked for next year, although in recent years the entire output for the following year has been under contract by this time. The requirements of railroads for 1909 is expected to be very heavy owing to the light consumption that has prevailed in 1908. The only heavy rail order closed this week was for 1,000 tons for the Tennessee Central railway, which went to the Illinois Steel Co. The demand for light rails and track supplies is improving, the local mill having taken about 5,000 tons of the former this month, mostly for delivery to lumber and mining companies. We quote as follows:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $28; 20-pound, $29; 16-pound, $30; 12-pound, $31. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.05c to 2.10c; with hexagon nuts, 2.20c to 2.25c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Cast Iron Pipe.—Contracts for an aggregate of 3,000 tons of cast iron pipe were received by the leading producer. In lots ranging down from 800 tons, the orders were divided among the following municipalities: Beloit, Kas.; Robinsonville, Ill.; Madisonville, O.; Milwaukee, Wis., and Oak Park, Ill. We quote 4 to 6-inch pipe, $27; 6 to 16-inch pipe, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—Jobbers and consumers continue to specify as their wants dictate. Low stocks seem to be maintained everywhere, judging by the frequent orders for mixed carloads.

We quote mill discounts, Chicago

delivery, carload lots, as below. On steel pipe jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force.

	—Steel— Black.	Galv.
¾ to 6 inches, inclusive.....	73.2	63.2
7 to 12 inches, inclusive.....	70.2	55.2
BOILER TUBES.	Steel. Iron.	Seamless.
2¼ to 5 in., inclusive....	63.2 50.2	50.2

Mill quotations on iron pipe are three points higher than the foregoing prices.

We have revised our prices from store, as below. A concession of one-half to one point from these prices is allowed by Chicago jobbers on carload orders shipped from local stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	—Steel— Black.	Galv.
⅛ to ¼ inch.....	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches.....	73	63
7 to 12 inches.....	69	54

Store prices for wrought iron pipe, carload lots, from Chicago stock, are as follows: One-eighth to ¼-inch. 61; ⅜-inch, 63; ½-inch, 65; ¾-inch to six inches, 70; 7 inches to 12 inches, 67. Boiler tubes from store are unchanged at 60 off.

Wire Products.—There is a good tone to the entire wire trade. A much brisker movement is expected in a few weeks, salesmen and jobbers reporting that agricultural stocks are low and that the demand is constantly improving. Shipments are very well maintained. We quote as follows:

Wire nails, $2.13; painted barb wire, $2.28; galvanized barb wire, $2.58; smooth annealed wire, $1.98; smooth galvanized wire, $2.28; polished staples, $2.23; galvanized staples, $2.53. Carload lots to retailers, 5 cents higher; less than carload lots, 15 cents higher.

Coke.—Coincident with the better demand and firmer tone in pig iron, foundry coke has taken on increased strength. Local melters are showing a favorable disposition to contract for their winter requirements, and while actual buying has not perceptibly increased, there is a decided improvement to the inquiry. We quote standard Connellsville foundry coke $2 to $2.25, and furnace coke for prompt shipment, $1.80 to $1.95 at the ovens.

Old Material.—Local scrap dealers again seem to be getting ready to spring another bull movement on the market. It is conservatively estimated that there are between 200,000 and 300,000 tons of scrap accumulated in various yards within a radius of 50 miles from Chicago, and it is getting burdensome to carry this enormous tonnage. The market is not yet ripe for its absorption, nor are existing prices sufficiently attractive to induce a selling movement, but with the increasing demand and the near approach of fall, an effort is apparently under way to manipulate prices upward. Despite this immense tonnage in storage, it is very generally understood that there are a large number of dealers who are heavily short on one grade or another. Consumers are calling for shipments more frequently and more insistently than ever before this year, and this demand is being used as the steps to the platform of high prices. Railroads have very little material in stock and while it is said that mills and foundries have under contract or in their yards all the material they can use for some months to come, it is noticeable that every list which appears on the market is quickly snapped up and the prices paid a little bit better than for the last appearing list. The only new list out this week is that of the Burlington, which contains over 3,000 tons. We have revised our prices, and quote gross tons in the first paragraph, as follows:

Old car wheels	$16.00 to 16.50
Old iron rails	16.75 to 17.25
Re-rolling rails (4 ft. and over).	15.75 to 16.25
Old steel rails (4 ft. and under)	14.25 to 14.75
Light section relayers, 45 lbs. and under, subject to inspection...	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards.....	14.25 to 14.75
Heavy melting steel.....	13.25 to 13.75

We quote, net tons, as follows:

No. 1 R. R. wrought.....	$13.25 to 13.75
No. 2 R. R. wrought.....	12.25 to 12.75
Knuckles, couplers and springs..	13.00 to 13.50
Shafting	16.00 to 16.50
Iron car axles	19.00 to 19.50
Steel car axles	17.25 to 17.75
Dealers' forge No. 1.....	10.50 to 11.00
Pipes and flues.....	10.00 to 10.50
No. 1 cast, 150 lbs. and less...	13.25 to 13.75
No. 1 mill	7.50 to 8.00
Mixed bushcling (Nos. 1 and 2).	8.00 to 8.50
Country sheet	4.00 to 4.50
No. 1 boiler cut.....	9.50 to 10.00
Boiler punchings	11.50 to 12.00
Cast borings	5.25 to 5.75
Mixed borings, etc.....	5.25 to 5.75
Machine shop turnings	6.50 to 7.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.75 to 12.25
Stove plate and light cast scrap.	12.00 to 12.50
Old iron splice bars.....	16.00 to 16.50

In a recent decision the United States board of general appraisers ruled that the board of review values in reappraisement proceedings need not have samples of the merchandise in question before it unless a correct conclusion of the value of the goods could not be arrived at without such examination. A single general appraiser and an appraiser, however, must in all cases see samples of the merchandise in order to find a legal and valid appraisement.

CLEVELAND.

Orders for Lake Vessels Placed—Other Negotiations Pending.

Office of THE IRON TRADE REVIEW,
Browning Building, Aug. 25.

Iron Ore.—Shipments of ore have increased slightly, and the August total will probably be somewhat larger than that of July, but the movement is still slow, and there is little prospect of decided improvement. The sale of ore is proceeding at a very slow rate.

On base ores, with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70, and Mesabi non-Bessemer, $3.50.

Pig Iron.—Only a moderate business is being done in the Cleveland district, and prices are certainly not any higher. The tendency in the valley has been toward weakness, while at Toledo quotations have been advanced 25 cents. One large Cleveland interest having several furnaces at Buffalo has sold nearly all the iron which it expects to make in that district this year. Deliveries on contracts indicate a somewhat increased melt. We quote, f. o. b. Cleveland, as follows:

Bessemer	$16.55 to 16.65
No. 1 foundry.....	15.40 to 15.80
No. 2 foundry.....	15.25 to 15.65
No. 3 foundry.....	14.90 to 15.25
No. 2 southern	15.85 to 16.10
Gray forge	14.00 to 14.50
Lake Superior charcoal.....	19.50 to 20.00

Coke.—The market continues quiet with very little demand for either furnace or foundry coke. On contracts, we quote furnace coke $1.60 to $1.80, and foundry coke $2 to $2.25.

Finished Material.—The Pittsburg Steamship Co. has contracted with the American Ship Building Co. for the building of two freight steamers which will have a capacity of about 13,000 tons each of ore, and will require about 5,000 tons each of steel plates and shapes. The plates will be rolled at the Homestead plant of the Carnegie Steel Co. The ship building company is also negotiating for 10,000 tons of steel to be used if boats now being figured on are contracted for. Propositions to build still 10 or 12 other vessels are pending and the outlook for ship building is very decidedly improved. The contract for the boiler shop to be built by the American Ship Building Co. in Lorain, involving about 900 tons of steel, has been awarded to the American Bridge Co.

The demand for nearly all finished materials is slowly increasing. A large amount of concrete construction throughout the country is calling for a considerable tonnage of reinforcing bars. The new hospital for the criminal insane to be built by the state at Lima, O., will require 400 tons of reinforcing bars. The general contract has been awarded to the National Fire Proofing Co., of Cleveland. Cleveland agencies have taken several orders for structural material for buildings at distant points, including one of 400 tons in British Columbia. An inquiry for several thousand tons of standard sections is pending from an electric railway company—the first inquiry of the kind which has appeared in a long while. The demand for light rails is fair, and owing to the high price of scrap, re-rolling companies are not taking so much business. Jobbers report that their business shows little, if any, improvement.

Old Material.—A softening in the market in both rolling mill and steel material was noted the past week, the reductions running from 25 cents a ton on heavy steel to 50 cents a ton on malleable iron. However, No. 1 railroad wrought iron was marked up 50 cents a ton and No. 1 busheling about the same. Local mills show continued reluctance to buy. We quote, f. o. b. Cleveland, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	15.00 to 15.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old car wheels	15.00 to 15.50
Old steel boiler plate	12.50 to 13.00
Steel axles	18.00 to 18.50
Malleable iron (railroad)	13.00 to 13.50
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	13.75 to 14.25
Country mixed steel	12.00 to 12.50
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.00 to 13.50
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.00 to 13.00
Iron axles	17.00 to 18.00
Axle turnings	9.50 to 10.00
Machine shop turnings	7.50 to 8.00
Grate bars	11.00 to 11.50
Pipes and flues	11.00 to 11.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 8.50
Sheet iron	6.00 to 6.50
Wrought drillings	7.50 to 8.00
Stove plate	11.00 to 11.50
Cast borings	7.00 to 7.50

CINCINNATI.

Pig Iron Market is Quiet, But Prices Are Firm.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Aug. 25.

The market during the past week has ruled quiet. Sales in this territory were light, and the inquiry was confined to small tonnages; only a few of which amounted to 1,000 tons. The largest of the inquiries which came out in the preceding week are still pending; and in two instances buyers have indicated an inclination to hold off. There is an inquiry for 2,000 tons of malleable for next year's delivery now under way. Southern furnaces are showing a tendency to advance their prices and a number of important producers have advanced their schedules to $13 Birmingham and, so far as can be learned, $12.50 Birmingham is the best that can be done unless some special circumstances surround the sale or resale iron be found at lower than furnace prices. Northern iron is unchanged and remains quotable at $15 in the Ironton district in spite of the firmness in the south. Some increase in the production of southern iron is noticeable, as the Rockdale furnace is now on foundry iron, the Rome furnaces at Rome, Ga., has blown in, and the Woodstock furnace will be in by Sept. 1; it is expected that the Florence furnace, of the Sloss-Sheffield Co., will be in by Sept. 1 and the Embreeville furnace will go into blast shortly. In the north, the only addition to production in this district is the blowing in of the Miami furnace at Hamilton, O., on Saturday. There is a considerable stock of iron on the furnace yards in southern Ohio. As an offset to the increasing production in the south, it is reported that the coal strike in the Birmingham district has a tendency to hamper production and to increase costs of making iron, through the necessity of augmenting local coke supplies by purchases in the Wise county and Pocohontas districts. We quote for third quarter and prompt delivery, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton as follows:

Southern foundry No. 1	$16.25 to 16.75
Southern foundry No. 2	15.75 to 16.25
Southern foundry No. 3	15.25 to 15.75
Southern foundry No. 4	14.75 to 15.25
Southern No. 1 soft	16.25 to 16.75
Southern No. 2 soft	15.75 to 16.25
Southern gray forge	14.25 to 14.50
Northern No. 1 foundry	16.70 to 17.20
Northern No. 2 foundry	16.20 to 16.70
Northern No. 3 foundry	15.70 to 16.20
Northern 8 per cent silicon	19.70

Finished Material.—While specifications on contracts during the month have been quite satisfactory, the past week has not kept pace with the first half of August. The jobbing demand is fair and prices are not quotably changed. Jobbers fill retail orders here at the following quotations:

Iron and steel bars, 1.85c to 2c, full extras. Angles, 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3/16-inch, 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c; and No. 28, 2.85c to 2.95c; boiler tubes, 2¾ to 5 inches, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3c base; cold rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

Coke.—The feature of the market is the demand for Wise county and Pocohontas coke to supply the furnaces in the Birmingham district during the coal strike. A considerable quantity has been sold from both districts and some contracts for Wise county coke covering the next six months are under negotiation. In the Connellsville district, the market is easy and ovens are apparently eager for orders within the range of previous prices. Prices in the leading coke producing districts are as follows:

	PER TON.
Wise county furnace coke	$1.90 to 2.00
Wise county foundry coke	2.10 to 2.25
Pocahontas furnace coke	1.60 to 1.75
Pocahontas foundry coke	2.00 to 2.25
Standard Connellsville furnace coke	1.75 to 1.80
Standard Connellsville foundry coke	2.00 to 2.25
Connellsville district furnace coke	1.60 to 1.65
Connellsville district foundry coke	2.00 to 2.25

Old Material.—Trading is mostly between dealers and the market is firm at quotations; as holders are inclined to maintain prices. Dealers' prices to consumers are as follows:

Old No. 1 R. R. wrought, net tons	$11.50 to 12.50
Cast machine and fdy., net tons	12.00 to 12.50
Old iron rails, gross tons	14.00 to 14.50
Old steel rails (re-rolling) gross tons	13.25 to 13.75
Old short lengths, gross tons	12.50 to 13.00
Old iron axles, net tons	16.00 to 16.50
Heavy melting scrap, gross tons	12.50 to 13.00
Stove plate, net tons	10.00 to 10.50
Wrought turnings	5.50 to 6.50
Cast borings, net tons	4.50 to 5.00
Car wheels, gross tons	13.50 to 14.50

NEW YORK.

Continued Activity in Pig Iron—Some Lower Prices Named.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Aug. 25.

Pig Iron.—Although interest in the iron market has shifted to some extent to 1909 delivery, on which furnace interests are very reluctant to consider business, the past week has witnessed a continuation of activity, with sales for the remainder of the year aggregating perhaps 25,000 tons. Of this a New England consumer took 5,000 tons of basic and another inquiry of like size is still pending in this territory. New England has been the chief contributor to eastern business of late, one selling concern

reporting a total of 18,000 tons in five contracts placed during the first three weeks of August. In the New York district, on a lot of 5,000 tons of No. 2 plain iron commanding a low freight rate from New Jersey and eastern Pennsylvania stacks, a considerable price concession is reported. There have been several sales ranging from 500 up to 1,000 tons and current inquiry includes a 5,000-ton lot of No. 2 plain. A number of producers are securing the $16 basis, at the furnace, on all sales, but a few interests are shading this figure somewhat, and the influence of western New York irons is still being felt, though the approach of the grain movement has sent up canal rates. The prices at which southern and Virginia products are being held keep them out of this market. For the first quarter of next year, the usual quotation is $1 above the current figure. We quote, tidewater delivery, remainder of the year, as follows:

Northern foundry No. 1	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	15.50 to 15.75
No. 2 southern foundry	16.75 to 17.25
Malleable	17.50 to 18.00
Basic	15.00 to 15.50
Gray forge	15.25 to 15.75

Ferro-Alloys.—Heavy buying of ferro-manganese is reported, transactions of the past week having run into several thousand tons, among this business being 1,000 tons for delivery over the remainder of the year and 1,000 tons for 1909 shipment. On early shipment the price is $44, seaboard, and on next year's delivery about $45.50. The larger of the inquiries reported as current a week ago has been placed. Some activity is noted in 50 per cent ferro-silicon at $68 to $70, Pittsburg. There have been a number of sales of ferro-manganese in small lots.

Finished Materials.—Structural and railway lettings of the past week have not been large. It develops that the 2,800 tons of steel for the office building on the Everett House site will be furnished by the Hay Foundry & Iron Works, which has been given the order by the Geo. A. Fuller Co., the general contractor. The New York Central has inquiries out for 11 bridges to be installed on its belt line at Buffalo. Bids have gone in on 6,000 tons of steel work for the Carolina, Clinchfield & Ohio railroad, and the 4,600 tons for the Long Island system is still pending. The Pennsylvania Steel Co. is reported to have taken two small bridges for the Lehigh Valley, and bridge contracts are pending from the Erie, Lackawanna, Buffalo & Lake Erie Traction and other lines. Early lettings are expected on several items making up the heavy tonnage involved in eastern building projects, practically all of which have been noted in these columns before. The Atlantic Coast Line has placed an order with the South Baltimore Steel Car & Fdy. Co. for 500 cars. Figures are being received for a warehouse at Boston for the American Sugar Refining Co., involving about 1,000 tons of steel.

In cast iron pipe, J. C. Rodgers was low bidder on the general contract for furnishing and laying 1,000 tons in New York City, but the award has not yet been made. The general contract for the Philadelphia fire main extension, involving about 1,200 tons of 8 and 12-inch pipe, went to Michael O'Rourke, of that city.

Plate business is relatively quiet. The Amityville extension contract is still tied up by legal proceedings. If steel pipe is used for the Springfield, Mass., pipe line, mentioned a week ago, some 8,500 tons of plates will be required, but cast iron pipe interests believe they have a good chance to land the business.

Aside from these lines there has been little change and we quote: Angles, 3 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.46c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

Old Materials.—Current business continues to be made up of small lots, though two or three inquiries of considerable size are being circulated by rolling mills. This is explained by the fact that these mills have been buying largely from the railroads direct, but of late have been outbid by dealers and are now attempting to secure their scrap in the open market. There is little demand from steel mills and, in fact, iron mill inquiry is confined to a few concerns. Old iron rails, railroad wrought and grate bars have advanced. It is understood that practically all tenders on the August offering of rails, involving a very good tonnage, were refused by the railroads. We quote, gross tons, New York delivery, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails, re-rolling	14.00 to 14.50
Relaying rails	20.00 to 21.00
Old car wheels	12.50 to 13.00
Old iron car axles	17.50 to 18.00
Old steel car axles	16.50 to 17.00
Heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	12.50 to 13.00
Wrought pipe	10.50 to 11.00
Cast borings	6.50 to 7.00
Wrought turnings	8.50 to 9.00
Heavy cast scrap	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Stove plate	10.50 to 11.00
Grate bars	10.00 to 10.50

PHILADELPHIA.

Good Volume of Orders for Pig Iron at Firm Prices.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Aug. 25.

Pig Iron.—Trade so far the present month has been as good, or better, than during July. The volume of business is considered fairly remarkable for this time of year and inquiry is said to be greater than at any time previous during 1908. Prices are firm at their present levels and show a disposition to advance. Southern iron has been eliminated somewhat from the market by its partial exhaustion of stocks and consequent advance to from $12.50 to $13, Birmingham. On the other hand, Virginia irons are coming into this territory quite freely and we note a decided disposition towards stiffer prices in those grades. Orders range from carload lots upward to 2,000 and 3,000 tons. The demand is mostly from the general foundries, the pipe interests and one railroad, the Pennsylvania, which has been buying for its shop requirements. Prices are as follows, f. o. b. buyers' yard, eastern Pennsylvania and surrounding territory:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
Standard gray forge	15.25 to 15.50
Basic	15.25 to 15.50
Low phosphorus	21.00 to 21.50
No. 2 Birmingham	16.50 to 17.00
No. 2 Virginia	16.75 to 17.25

Finished Materials.—The finished market is very quiet, the most marked activity being in plates and shapes. Indications, however, point to heavier operations on the part of the rolling mills and foundries. Prices for delivery in this territory are as follows: Structural, 1.75c to 1.90c; plates, 1.75c to 1.80c; refined iron bars, 1.40c to 1.45c; steel bars, 1.55c.

Old Material.—There seems to be a wide range of prices in this market, but the undoubted tendency is upward. Buying grows in volume and is becoming more general. It seems to be more for the purpose of laying in stock against a more prosperous day on the part of the steel companies than for immediate requirements. We quote as follows, delivered:

Old steel rails (re-rolling)	$16.50 to 17.00
No. 1 steel scrap	14.50 to 15.00
Old steel axles	20.00 to 21.00
Old iron axles	22.00 to 23.00
Old iron rails	19.50 to 20.00
Old car wheels	14.50 to 15.00
Choice scrap R. R. No. 1 wrought	18.00 to 18.50
No. 1 yard scrap	15.50 to 16.00
Machinery scrap	15.00 to 15.50
Low phosphorus scrap	19.00 to 19.50
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire scrap	12.00 to 12.50
No. 2 forge fire scrap, ordinary	9.00 to 10.00

Wrought turnings	11.00 to 11.50
Axle turnings, heavy	12.00 to 12.50
Cast borings	10.00 to 10.50
Stove plates	13.00 to 13.50

BUFFALO.

Tendency Toward Firmer Conditions in Pig Iron—More Foundry Business.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Aug. 25.

Pig Iron.—This market, although continuing quiet, is holding up without change of prices in either direction. The tendency toward a firmer condition has not diminished and some improvement is found in the movement of foundry iron. Throughout the first half, the movement was very light. Now the foundry grades are moving more rapidly than at any time in the past six months and shipments handled with less delay. Inquiries, even of the smaller class, have not been numerous, chiefly due to the absence of many of the manufacturers, who have been taking advantage of a dull period for rest.

The foundries in Buffalo are working nearly 50 per cent of capacity, which, estimated, is an increase of 20 per cent over the condition of six months ago. Foundrymen report that inquiries are becoming more numerous and they feel here that there is a substantial improvement in conditions near at hand, at least so far as the foundry business is concerned. There are a few foundries here, which by reason of the class of business done, have not shared any improvement of late. One big foundry plant is entirely closed for the present and several are operating without profit in order to give employment to the men. There are two large foundry plants, however, which have operated at about full capacity continuously. We quote f. o. b. Buffalo as follows:

No. IX foundry	$16.00 to 16.50
No. 2X foundry	15.50 to 16.00
No. 2 plain	15.00 to 15.50
No. 3 foundry	15.00 to 15.50
Malleable Bessemer	16.00 to 17.30
Gray forge	14.75 to 15.25
Charcoal	20.25 to 20.75

Finished Material.—The Excelsior Steel Ball Co., of this city, whose plant sustained considerable damage by fire, is preparing to rebuild at an expense of $500,000 for new material. This will include general equipment. Canisius College will be supplemented by four additional buildings and the steel companies are now figuring on the material needed. The General Electric Co. will erect a five-story office building, but the construction will probably not begin before the early part of next year. Local steel men are also figuring on a proposed addition to the buildings of the International Salt Co., of Syracuse, a matter of small tonnage. The Canadian Hydro-Electric Commission has let contracts for the construction of 253 miles of power transmission. Between 6,500 and 7,000 tons of steel will be used in the tower construction. The plain material will be furnished by the Ontario Iron & Steel Co., of Welland, Ont. The Canadian Bridge Co., of Walkersville, will build the towers.

It is understood that the capital controlling the Ellicott Square is figuring on spending $750,000 in additional stories. The structure is a 10-story building and it is possible that six additional stories will be added.

ST. LOUIS.

Numerous Inquiries Pending and Prices Are Strong.

Aug. 24.

Pig Iron.—Prices are strong in the St. Louis territory covering immediate and future shipments of pig iron. Some of the furnaces have withdrawn from the market, having practically closed out their output for two or three months. Quite a number of inquiries are out, the largest being for 2,000 tons foundry iron for delivery over the remainder of the present year. One of the largest car manufacturing companies in the city is the prospective purchaser. Other inquiries aggregating 3,000 or 4,000 tons in lots of from 1,000 tons to a carload are out, and another inquiry for a round tonnage for shipment over the first quarter of 1909.

Our prices delivered, to which the Birmingham freight of $3.75 has been added, follow:

No. 1 southern	$16.75 to 17.25
No. 2 southern	16.25 to 16.75
No. 3 southern	15.75 to 16.25
No. 4 southern	15.25 to 15.75

Coke.—Prices are firm at $2.25 to $2.75, ovens, for 72-hour selected Connellsville foundry coke for immediate and contract shipment. Furnace coke, 48-hour, is offered at $1.75 to $2, Connellsville ovens. Several inquiries are out for coke and it is believed that a good tonnage will be placed within 10 days.

Virginia selected 72-hour coke is quoted at $2.25 ovens for shipment during the present year and at $2.50 for shipment next year. Furnace coke, 48-hour, Virginia ovens, is offered at $1.75 for the remainder of the year and at $2 for shipment during the first of next year. The freight rate on Connellsville and Stonega, Virginia, coke after Sept. 1 will be $2.80 to East St. Louis and St. Louis, and Stonega rate will be $2.70 when destined beyond St. Louis.

Finished Material.—Bids for the construction work on the new $1,000,000 Carnegie library will be opened by the St. Louis public library board Tuesday, but the contract probably will not be awarded for some time.

Old Material.—The market is reported unchanged with quotations as follows:

Cast iron borings, free from foreign material, net ton	$ 5.50
Steel axle turnings, net ton	8.50
Steel railroad axles, net ton	$17.50 to 18.50
Iron railroad axles, net ton	18.50 to 19.50
Miscellaneous steel scrap, gross ton	10.25
Old car wheels, gross ton	14.50 to 15.00
No. 1 railroad cast scrap, net ton	12.00 to 12.50
Heavy machinery cast, net ton	13.00
Stove plate and light cast, net ton	9.50
Sheet iron, net tons, uncut	4.00
No. 1 railroad wrought, net ton	10.50 to 11.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	11.50

BIRMINGHAM, ALA.

Pig Iron Prices Tending Upward—Strike Causes Some Trouble.

Aug. 24.

Pig iron quotations in the Birmingham district are approaching the $13 per ton mark, No. 2 foundry. This price has been made for small lots, immediate delivery, already, though very few sales have been made at the quotation. It is announced that some inquiry has been received in this district for iron to be delivered during the first quarter in next year, but if any sales have been booked, nothing is being said of it. The furnaces in operation in Alabama at present are doing nicely, in fact, under existing conditions, there is great satisfaction expressed. Considerable coal and coke is being brought into the district from other states while the strike of the coal miners is on. The inconvenience is not so very great. The importation of coal and coke prevents hesitation in the iron production. The Alabama manufacturers are anxious to keep the iron make up to the best possible mark.

The third furnace of the Republic Iron & Steel Co. at Thomas, Ala., near here, is ready for the torch, but it will hardly be applied until the coal and coke situation improves. The Sloss-Sheffield Steel & Iron Co. has a furnace almost ready to blow in. Two other furnaces are in a similar condition. The demand for iron is improving steadily and, with all conditions favorable, the increased production will be warranted. There is a continuation of a heavy consumption of iron in the home territory.

BRITISH IRON MARKET.

Slight Revival in Trade and a Brighter Outlook.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Aug. 15.

The slightly more optimistic tone of a week ago now proves to have foreshadowed a slight revival in the iron trade. The market this week is distinctly firmer, and there is a stronger tone. In the Middlesbrough market, the prices of higher qualities of iron are more favorable to sellers than for a considerable period, and higher rates have prevailed during the past few days for No. 3 Cleveland than at any time since the middle of last May. Yesterday's quotation was 51s 3d ($12.54), an advance on the previous day of 3d, and there are indications that prices will go yet higher. Connal's stores have now 55,711 tons of Cleveland iron, an increase on the week of some hundreds of tons. The increased strength is not reflected in the hematite department, where conditions daily become more depressed. Prices continue to fall, and yet there is no hematite stock at all in Connal's, and only about 5,000 tons of West Coast hematite in the public stores of Cumberland. Locally the market has responded to the changed position of affairs, and prices are about 1 shilling higher on the week. The reason for the increased strength is not easy to ascertain, but would seem to be mainly due to the approach of autumn, when prices are not likely to go lower. Buyers, realizing that they can buy at the present time very advantageously, are laying in stocks at better rates than are likely to prevail a few weeks hence.

New Welding Process.—A new welding process, recently invented by A. K. Schaap, of Brooklyn, N. Y., was given a public demonstration recently. The process is novel in that it secures a temperature up to about 5,000 degrees merely by the use of ordinary city gas and air, the latter under two pressures, hence the cost of operation is exceedingly small. The process is adapted for autogenous welding of iron, copper, brass and other metals; it has been in practical use at the automobile repair shop of the inventor for some months with complete success.

New York Central lines west show a decrease in July in loads hauled of 92,146, and an increase in empties hauled of 32,172.

GERMAN IRON MARKET.

Business Still Depressed and Prospect Gloomy.

Dusseldorf, Aug. 17.—There has been hardly any alteration in the situation of our iron market during the last four weeks. All lines of the trade are utterly depressed and the prospects are not better. The uncertainty about the renewal of the pig iron syndicate continues to press on the market heavily. It is true that the quantity of orders has increased slightly during the last few weeks, but the prices are still as ruinous as before. The reports of the great syndicates, like the coal syndicate, the Stahlwerksverband, etc., still try to describe the situation as better than it is, but the statistics of production and deliveries speak another language. When nearly all prices are now down below costs, one would think that we are at the bottom and that a standstill should be likely. However, this is not the case yet and we will not be at the bottom until we see clearly about the future of the different syndicates. Nobody believes here that the pig iron syndicate will become renewed in any form, although people of great importance are trying every effort for a renewal. It is especially the well-known Donnersmark group, viz., the Eisenwerks Kraft at Stettin and the Niederrheinische Hutte at Duisburg that are obstinate. These works are so favorably situated that they will do better without a syndicate. In semi-finished and finished material our works for their greater part live from export orders, as the inland, on account of the high prices of the syndicates, is unable to stand the competition abroad. In any case, it is quite impossible for the situation to improve still this year, and the prospects for 1909 are still very gloomy.

MOVE SHEET MILL PLANT TO MASSILLON.

Under a contract signed by A. B. Clark, of Canton, and officers of the board of trade of Massillon, O., Mr. Clark will erect five sheet mills, with a capacity of from 15,000 to 18,000 tons annually, at Massillon. To secure the plant, the board of trade agrees to raise $20,000 in cash, in addition to 15 acres of land along the B. & O. railroad west of the Columbia yards of the Wheeling & Lake Erie, at Massillon. Mr. Clark is quoted as saying that the plant, which he will locate at Massillon, is that which is now operating at Waynesburg, Pa.

METAL MARKET

CHICAGO.

Aug. 25.

The metal market is in substantially the same position it has been in for the past two weeks. Demand is of a very light order, being wholly for current needs, and these reduced to a minimum, and prices show no inclination either to recede or advance. We quote for delivery in small lots as follows:

Lake copper, 14¼c to 14½c; casting, 14c to 14¼c; pig tin, 33c to 33½c; spelter, 5c to 5.10c; pig lead, desilverized, 4.75c to 4.90c in 50-ton lots; corroding, 4.90c to 5c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle, in car lots of 600-pound casks; Cookson's antimony, 11c to 11½c; other grades, 10c to 10½c.

Neither is there any change in old metals, the local market being almost stagnant. We quote to dealers as follows:

Copper wire, 11½c; heavy copper, 11½c; light copper, 10¾c; heavy red brass, 10¾c; heavy yellow brass, 8½c; light brass, 6½c; No. 1 red brass borings, 8½c; No. 1 yellow brass borings, 7¾c; brass clippings, 8½c; tea lead, 3½c; lead scrap, 3¾c; zinc, 3.10c; tin pipe, 25c; tin foil, 22c; pewter, 18c; electrotype plates, free from wood, 4c; electrotype dross, 2¾c; stereotype plates, 4½c; stereotype dross, 3c; prime slab zinc dross, $55 per ton.

NEW YORK.

Aug. 25.

Copper.—Further evidence that the buying spurt of the first half of August was artificial and not warranted by conditions has been furnished by the extremely limited volume of business during the past week. Sales have not only been small, but have been chiefly from second hands and frequently at the lower figure of the present quotation or under. The market shows no indications of returning strength. We quote: Lake, 13¾c to 14c; electrolytic, 13⅝c to 13⅞c; casting, 13⅜c to 13⅝c.

Pig Tin.—Although the foreign situation is perhaps a little stronger than at last reports, the domestic market is still practically lifeless. Spot metal can be had at about 29.50c, New York, and the range for various deliveries is 29c to 29.75c.

Pig Lead.—There has been no change in the market, as business has run exceedingly light during the

week. We quote 4.57½c to 4.62½c, New York.

Spelter.—Brisk competition for the limited business going has sent down prices slightly to the level of 4.65c to 4.70c, New York.

Antimony.—Cookson's, 8¼c; Hallett's, 8c to 8⅛c; ordinary brands, 7½c to 7¾c.

ST. LOUIS.

Aug. 24.

Lead and Zinc.—There was an average drop of $1 a ton on both lead and zinc ores in the Missouri-Kansas district last week, the highest price reported paid being $38.50 for zinc on an unchanged basis of $36.50 for 60 per cent ore. The bulk of the ore, however, was sold for lower prices, ranging from $36 to $37 a ton.

The high price for lead was $62 a ton, showing a slight shading, with a portion of the sales at $60, only the choicest lots demanding a higher price. Shipments were about on an average, and when the week closed there was little accumulated ore unsold in the bins.

St. Louis Builders Organize.—The Building Industries Association, composed of building contractors, including the subcontractors and material men, has been formed in St. Louis. Articles of incorporation were signed at a meeting in the Century building by about 200 members several days ago. Others have signified their intention of becoming members. The organization represents a business of about $50,000,000 a year, and the new association promises to become one of the foremost business institutions in the city. The following officers were elected: President, James L. Westlake, of the Westlake Construction Co.; first vice president, O. G. Selden, of the Selden-Breck Construction Co.; second vice president, W. H. Swift, of the Fruin-Bambrick Construction Co.; third vice president, W. M. Sutherland, of the William Sutherland Building & Construction Co.; treasurer, S. M. Lederer, of the Pickel Stone Co.

Will Meet in Chattanooga.—Owing to Alabama labor troubles, the American Institute of Mining Engineers will meet at Chattanooga, instead of Birmingham, the week of Sept. 29.

On the application of the Thomas Iron Co. and other creditors, receivers have been appointed for the Duncannon Iron Co., Philadelphia. The receivers' bond is fixed at $50,000.

TARIFF CHANGES.

Through Canadian Order in Council, Provide Duty Free Admissions.

Toronto, Can., Aug. 24.—An order in council has been passed at Ottawa making a number of changes in the tariff. Among articles placed on the free list is brass in bars and rods in coil or otherwise, not less than 6 feet in length, and brass in strips, sheets or plates, not polished, planished or coated.

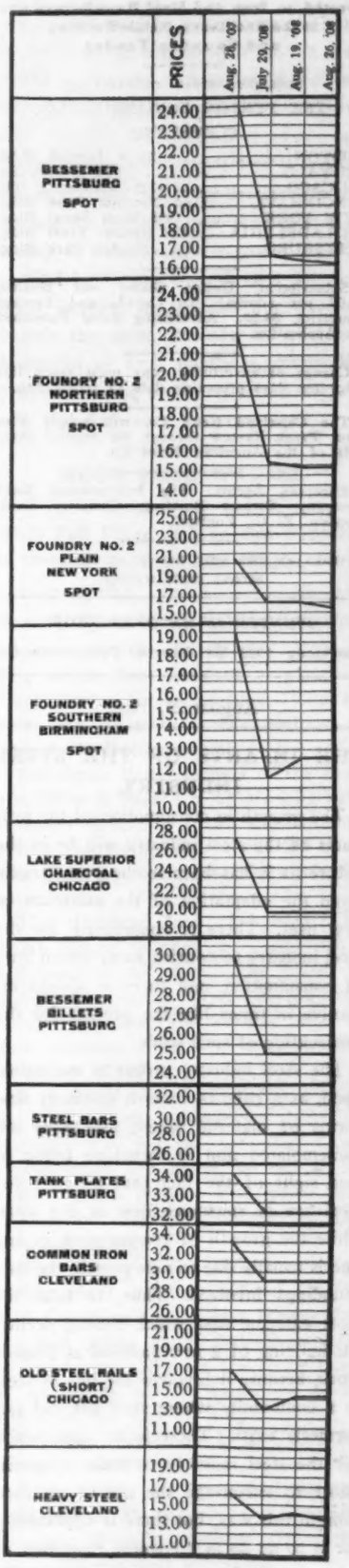
Iron or steel rods, rolled or drawn, not less than 5/16 of an inch in diameter are duty free when imported by manufacturers of chain, for use only in the manufacture of chain in their own factories.

Finished parts of iron or steel, for repairs of portable engines or of traction engines for farm purposes are to be subject to the following reduced duty: British preferential tariff 5 per cent ad valorem; intermediate, 7½ per cent ad valorem; general tariff, 10 per cent ad valorem.

Flat steel, cold rolled, not over ½ inch thick, for use only in the manufacture of cups and cones for ball bearings when imported by the manufacturers of ball bearings are rated as follows: British preferential tariff, free; intermediate and general tariffs 5 per cent ad valorem.

Rebuilding Burned Plant.—The Albany Iron Works, Albany, Ore., manufacturer of steam engines, mining and mill machinery, advises respecting its recent fire that the plant was totally destroyed with the exception of a large two-story brick warehouse, which was damaged. The buildings burned include a foundry 36 x 55 feet, machine shop 30 x 60 feet, blacksmith shop 28 x 36 feet, wood working department 30 x 54 feet, and office 16 x 30 feet. These buildings were all of wood, and will be rebuilt of the same material and on the same foundations. Some of the lathes, drills and other valuable machines were saved, being somewhat damaged, but repairable. The patterns and manufactured machinery being in the storage, were not damaged. In part of the lower story of the warehouse, motors and some machinery have been installed and a machine shop has been placed in operation. Plans have been made, the rubbish cleared off the site, insurance adjusted, and active building operations have been commenced, so that it is planned that the new plant will be in running order in about two months.

PRICE CHART.



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THE INFANTS OF THE STEEL INDUSTRY.

The growth in consumption of the products of the steel industry will be in the future as it has been in the past, largely from the adaptation of the materials to new uses. There is opportunity for the steel industry to nourish many infant lines of consumption, and there is special incentive in times like the present for the prosecution of such work.

The steel industry proper is not called upon, as a rule, to furnish distinctly new forms of material where new uses are contemplated and is therefore prone to lose sight of the fact that all uses for steel are in substance new at the start, while the growth of consumption in any line is usually due to new uses in the surroundings involved. Thus, to take the most extreme case which readily occurs, the building of a new railroad is pioneer work, because it involves the use of steel in a community where such use did not formerly exist. There is no opportunity for the steel industry to make a special effort to encourage the use of railroad rails in this way, but there is opportunity for it to do so in a cognate case, that of wire fence. It is old and familiar in some districts while it is comparatively new and untried in other districts, and for years the fence manufacturers have carried on a campaign to educate communities to the use of wire fence. Their campaign has brought sure and adequate returns.

The grand divisions in steel products may be named as rails, shapes, plates and sheets, pipe, bars, including bands and hoops, and wire. Rails might be considered a hopeless case for exploitation, but it is not so. The use of track involving steel rails has been increased by the design of industrial track in complete sections, whereby the track itself is a manufactured product, susceptible of being used and reused in a new connection, and such track is used in some cases where no track at all would be used if the user had to lay the track in the usual manner, from purchased rails and ties. Such a use is not important in point of tonnage; it is cited to show what can be done in the way of exploiting a form of steel which is apparently hopeless for exploiting purposes.

Plates furnish a much more hopeful case. Some six years ago, one of the leaders in the steel industry encouraged an experiment in the laying of a pair of narrow plates on country roadway to furnish a track for any manner of vehicle, and save the ordinary road material. That possible use would bear further exploitation now when the durability of the ordinary macadam under such heavy automobile traffic has become such a serious question. In several distinct ways the steel industry proper encouraged the manufacture and use of steel cars. Consumption of plates in this connection has been very much larger than would have been the case had the steel manufacturers not been so ready to encourage the new industry.

Sheets are one of the most promising lines of all for direct exploitation of new uses. In no important direction is the replacement of wood by steel made with less change of general appearance or practice. The plasterer performs his work over steel lath instead of over wooden lath with little fresh training, and there is no change at all in the appearance of the finished wall. Metal furniture, made from sheet steel instead of wood, does not present a materially different appearance. At various points in building construction sheet steel is used without important change in the general design.

In pipe there have been distinctly new uses created, and that largely by the direct advertising of the pipe producer, who makes his pipe in the new finished form. The most conspicuous example is probably the steel pole used for supporting trolley wires, but many others could be cited.

Merchant mill products have always been made through such a wide range of sizes and shapes that a consumer for a new use has generally always found the requisite material ready made, and the same is true of wire, which involves but one dimension, and no statement of shape, in the specification.

One of the most promising for expan sion of all forms of steel is the structural shape, and this despite the fact that of all important steel products the tonnage of structural shapes produced has already been increasing the most rapidly. Thus far the growth of consumption has been chiefly in directions where no other material offered itself. Tall buildings and bridges of long span can be built of nothing else than steel. The practicable limit in height of buildings and length of bridges is being reached, and the time is at hand when the structural trade should develop the use of steel in buildings at the other extreme. It should endeavor to do in buildings what it has been doing in bridges. It will take a contract for a bridge involving thousands of tons of steel, or it will furnish steel for the smallest bridge, requiring perhaps only a couple of I-beams of a stated length and section. With small buildings it is a question of supplanting wood, so that there is a competition which is lacking in the case of large buildings. The same methods of construction cannot be followed in small as in large buildings, the expense of fabricating and erecting being prohibitive, but different forms of connection can be devised for small structures, whereby the work of manufacture would be light and the work of erection less than in the case of wood. Beam sections thus used would require no fabricating but cutting to exact lengths, and a standard clip could be used for each size. Even on the present market such small shapes are sold at a lower price than the regular structural shapes, and with a sufficient increase in tonnage

a further reduction could be made. To introduce such a form of construction for the relatively small buildings, now erected of wood, the widest publicity would be required, upon a campaign similar, perhaps, to that being waged by the cement manufacturers, who are exploiting with vigor the use of concrete for many relatively new purposes.

A somewhat clearer system of ethics for the trade may have to be formulated before steel manufacturers can feel free to exploit new uses for steel in some connections. Their relations with consumers in special lines have become confidential in many cases, the consumer and manufacturer exchanging information whereby the material is made adaptable to the special use of the consumer. In some cases the manufacturer receives information from the consumer which the latter would regard as confidential and would not wish to be communicated to prospective competitors. That the steel producer should be free to encourage the use of his products by as broad and active a campaign as justice would permit, requires that the rights of a pioneer user of a given product should be clearly defined, but not unduly or unnecessarily expanded.

AVERAGE COMMODITY AND STEEL PRICES.

For two months Bradstreet's index number of commodity prices has shown an increase, otherwise being lower than at any time since the middle of 1905. The low point in the period in which this index number has been compiled was July 1, 1896, $5.7019. The high point since then was $9.0409, on July 1, 1907. The low point since the latter date has been $7.7227, June 1 last. There was an increase to $7.8224 July 1, and to $7.9328 August 1.

The indication of the past two months is that the trend is upward, and the showing is sufficient to give some backing to the belief that the general downward trend in prices has been arrested. As opportunity is afforded from month to month to study the course of industry since the panic of October and November last, evidences are multiplying that the depression is to be one of short rather than long duration, and that already substantial progress towards recovery is being made. In the retrospect, it is easy to pick out the big and the little depressions, but at the time it is always difficult to diagnose. Just after the panic of June, 1893, there were many prophets who could see to their own satisfaction that only a short depression was in progress and that business would soon resume its former activity, but their diagnosis was wrong. Late last year there were many prophets who saw a correspondingly dismal outlook, and predicted a recurrence of the 1893-7 troubles. These citations are not for the purpose of discrediting prophets in general. The ones referred to may in both cases have constituted a minority, but they were quite a respectable minority nevertheless.

It is interesting to compare the movement of commodity prices in general, as shown by the Bradstreet compilation, with the movement of prices of steel commodities. By a system giving to each finished steel product (disregarding pig iron, billets, etc.) its due weight in proportion to the tonnage produced in the last two active years, it has been shown that the lowest prices ever recorded made an average of $25 per gross ton. These low prices were not contemporaneous, but were made at various times during 1897 and 1898. At no one time did the general average fall as low as $25. The present average is found to be about $39 per gross ton, thus showing a net advance of 56 per cent. Bradstreet's present average shows an advance from its low point of 39 per cent. The two percentages are not greatly different, considering that the low point in steel products was a composite of low points made at different times.

The average value of steel products, on contract, in 1902, has been computed at about $42.60. Actual market prices averaged materially higher than this, the figures used for the average being those at which favorable contracts were made. From then to the present average there has been a decline of 8.5 per cent. Bradstreet's index number of all commodities, from 1902, shows a materially smaller decline, 2.6 per cent.

Thus, while steel products have advanced slightly more than all commodities since 1897 or 1898, they have declined materially more than other commodities since 1902.

There has been no movement towards higher prices for steel products in the past two months to correspond with the slight advance in general commodity prices, but there is evidently nothing in the general movement of prices which would indicate that steel products should decline at this time.

Comparisons like these show the utter insufficiency of comparisons of the mere prices of a given commodity at different times. The value of a dollar is continually changing. A large part of the apparent advances in wages and commodities in the past ten years has been merely on paper. In ten years the amount of money in circulation, per capita, has increased by 43 per cent, despite the very great increase in facilities for payment outside the actual transfer of currency. Measured by such standards, commodity prices, including steel products, are lower now that they were ten years ago.

MORE RESUMPTIONS

With Full Force of Men Are Reported For Indiana Iron Plants.

Indianapolis, Ind., Aug. 24.—The Security Trust Co. has been appointed receiver for the Castle Ice Machine Co., which has operated a plant on Neal avenue for some time. The action was taken upon the petition of Alfred B. Hollingsworth.

Kitzelman Bros., owners of the Indiana Wire & Steel Co. at Muncie, have resumed operating in all departments, giving employment to about 250 men. The plant has been practically idle for some time.

The Highland Iron & Steel Co., Terre Haute, is now operating with a full force of 600 men. The plant resumed last week after having run about half time for several months. The company reports a large number of orders ahead.

It is stated that the 300 box cars to be built by the American Car & Foundry Co. for the Isthmian Canal Commission, will be turnel out at the Jeffersonville plant. The price was $993 a car, delivered on the isthmus knocked down.

Fire destroyed the shovel manufacturing plant of the Indiana Rolling Mill Co., New Castle, last Wednesday, the loss being about $30,000, covered by insurance. Repairs are to be made at once but in the meantime about 100 men are out of employment.

The city council of Logansport has appropriated $38,000 for re-equipping and repairing the municipal electric light plant. Plans include a new 500-kilowatt, 60-cycle turbine generator and a 150-kilowatt generator.

MACHINERY BUILDERS

In Milwaukee Are Buying as Well as Implement Makers.

Milwaukee, Wis., Aug. 24.—General improvement is slowly taking place in the Milwaukee iron and steel situation. Several factors seem to be causing the revival of conditions, chief among them the increased demand for material from the leading machinery producing concerns in the city. General business has improved to the extent that manufacturers are operating at almost the full capacity with the result that larger and more frequent orders for raw material are being placed.

The splendid condition of the crops all over Wisconsin is carrying with it a corresponding improvement of the industries engaged in the manufacture of agricultural implements and indirectly this improvement is being reflected in the iron and steel field. C. W. Bixby, manager of the Gale Implement Mfg. Co., is of the opinion that Wisconsin implement manufacturers are receiving exceptional orders and that the Gale company is receiving an amount of business, equal to that of last year. The F. E. Myers & Bros. Co., manufacturer of hay tools, announces that it has had the best season experienced in the last 20 years. Similar reports are received from the International Harvester Co., the Lindsay Bros., and other leading agricultural implement manufacturers of the city.

A bonus of $105,000 will be received by the Allis-Chalmers Co., Milwaukee, for furnishing pumps to the Chicago sanitary drainage system of higher power than was required by the specifications. The pumps, which are of the giant screw type, were built for the intercepting sewer station at Thirty-ninth street, Chicago, and tests have demonstrated the fact that they have a capacity of more than 50 per cent in excess of the contract specifications. The capacity of each pump is such that 320,000 gallons of water may be handled each minute.

Rowell & Son, manufacturer of car movers at Appleton, Wis., has made recent large shipments of its product to England, Ireland and Wales. The plant of the company is operating at full capacity, 200 movers per day.

Orders for the past three months of the Allis-Chalmers company have shown a great increase over those of the previous months and the West Allis plant is now employing 80 per cent of its employes.

The Filer & Stowell Co. will have a large output of cotton and saw mill engines and machinery to register before the month is over. The Pawling & Harnischfeger Co. has especially large orders for traveling cranes of the large type, the Nordberg company is receiving excellent orders from the copper mines and from iron producers all over the country, and the Wisconsin Iron & Wire Works is in receipt of exceptionally large orders.

SHEET MILLS SOLD.

Capt. Alfred Hicks, organizer of the Allegheny Iron & Steel Co., has sold his entire interest in the sheet mill plant located at Brackenridge, Pa., to Harry E. Sheldon, formerly superintendent of Kirkpatrick & Co., at Leechburg, with several associates. In the reorganization which followed, Mr. Sheldon was elected president and general manager, R. D. Campbell vice president and treasurer and Frank H. Stephens, secretary and auditor. The plant also includes an open-hearth department with three basic open-hearth 50-ton furnaces, having an annual capacity of 80,000 gross tons. The sheet mill has an annual capacity of 30,000 tons of sheets.

Reopening of Old Mines.—Through the granting of authority by the New York state public service commission to construct the Champlain & Sanford railroad, Essex county, it has been learned that iron ore mines at Sanford Lake, Essex county, are again about to be put in operation. Mining operations in the district were conducted from 1820 to 1851, but abandoned in that year. The new road which is to be built to reach the mines, will be operated by electricity, and will be 58 miles long. Preliminary surveys of the mining district indicate about 300,000,000 tons of ore, with an iron content of about 50 per cent.

Chicago Pneumatic Earnings.—The earnings of the Chicago Pneumatic Tool Co. for the first six months of 1908 were sufficient to give a balance of only $18,085 for dividend payments after the deduction of depreciation and sinking fund charges. This compares with a balance of $316,394, available for dividends in the first half of last year. The company's sales were 40 per cent less for the first half of 1908 than the same period last year.

SHOPS ARE RESUMING.

Several New England Foundry and Machine Companies Reorganized.

Worcester, Mass., Aug. 22.—The old factory of the L. W. Pond Machine Tool Co., with the land on which it stands, is to be sold at auction Aug. 26 under foreclosure proceedings. In 1861 L. W. Pond and Ephraim H. Bellows, under name of Samuel Flagg & Co., bought the property and enlarged the building. In 1873 Mr. Pond bought a sole interest, but experienced financial difficulties and the property passed over to the Pond Machine Tool Co., now located at Plainfield, N. J. It is in default of interest payment on $50,000 mortgage placed on the property by the late L. W. Pond that the place is now under the hammer.

Peck, Stow & Wilcox, Southington, Conn., are running their plant again, which had been closed since June 27. H. D. Smith & Co., makers of edge tools, same place, have also started up again.

The Smith & Winchester Co., Willimantic, Conn., maker of paper machinery and laundry machinery, has awarded contracts for new buildings, intended to increase capacity by 50 per cent.

The Worcester Steel Foundry Co.'s plant, Millbury, Mass., has been sold. The company will be reorganized with William E. Oakley and Henry T. Maxwell at the head. All the Oakley patents will belong to the new concern. The plant starts out with about 75 hands, and it is intended to operate day and night shifts.

The Thrasher Clock Co.'s plant, Manchester, Conn., has been sold to Levi T. Snow, of New Haven. Mr. Snow is reported to intend conducting some new experiments and may run the plant along new lines.

The Chase Turbine Mfg. Co., Orange, Mass., has shut down for an indefinite period, throwing out of employment about 100 employes.

The Crompton & Knowles Loom Works started up Aug. 10 with 2,100 men, after a 10 days' vacation, but the works are not running on full time. As soon as the big new additions are ready at the Grand street works, the removing of the machinery there from the old Green street works will commence, and ultimately the entire plant will be concentrated at Grand street.

The Bristol Engineering Co., Bristol, Conn., will make taxicabs for the American Taximeter Co. The company has an order for 200 cabs.

LEAD BELT PROSPERITY.

Recovered From Financial Depression —New Methods of Mining.

St. Louis, Aug. 22.—The St. Francois county lead belt has recovered from the financial depression of last fall, and all of the lead companies are working full shifts of men. The Federal Lead Co., the largest employer in the Flat River district, has approximately 2,000 men on its pay roll at this time. This company also has just begun a campaign of development work. More than 100 diamond drills, which were put away last fall, are now at work throughout the district, and the Doe Run Lead Co. is pushing the work on its new mill.

From the Madison county mining district come reports of increased activity. Much development work is being done in the vicinity of Fredericktown, and the diamond drills are all at work on good contracts.

For the first time in the history of the United States, cobalt and nickel have been successfully separated and refined by the North American Lead Co. of Fredericktown. Heretofore it has been found necessary to ship all American nickel ore and cobalt ores, to the refinery at Swansea, Wales, or to the Rothchild refinery in France, but the North American company has perfected a process of separating the three metals without difficulty.

The Mine La Mott Lead & Smelting Co. of Mine La Mott, one of the oldest lead properties in North America, promises again to go to the front as one of the leaders of the world in the production of nickel. Its new mill will be rapidly completed according to the president of the company, A Dempster.

What is considered by many Joplin miners to be the beginning of the end of hand labor in the lead and zinc mines is found in the workings of the American Zinc, Lead & Smelting Co., near Prosperity, Mo. The company is trying out a new steam shovel underground, and so far as known this is the only instance in the world of a mechanical shovel beneath the surface. In appearance the shovel resembles the ordinary underground steam shovel. It is more compact and is shrouded in a massive steel hood to protect it from bowlers falling from the roof. The weight is ten tons. The machine can be utilized in any drift having a height of 14 feet and a few on each side to swing the boom. The dipper lifts from 600 to 700 pounds of dirt at each grab, and two grabs will fill the largest tub used in the mines there. Three engines are used. One swings the boom, another operates the dipper, and the third furnishes traction power to move the machine from drift to drift or out of harm's way when the blasting is done. Compressed air carried from the surface into the ground through the shaft is the motive power that drives the engines. The machine in use has proven its ability to handle all grades and sizes and conditions of broken dirt.

REPAIRING PLANTS

In Preparation For Busy Times Coming Throughout Eastern Pennsylvania.

Harrisburg, Aug. 24.—Repair work appears to be occupying the time of most of the blast furnace men in this section of the state at present. The stacks of the Pennsylvania Steel Co. in Dauphin and Lebanon counties, which are not in blast, have been overhauled and made ready to start and the Lackawanna company has also prepared its furnaces in the Lebanon district. Marshall furnace in Perry county has been overhauled and in Bedford county the two Thropp furnaces will be put in blast within a month. The Warwick Iron & Steel Co. has commenced the reconstruction of its No. 3 furnace, formerly Anvil furnace, at Pottstown.

Most of the works in this locality are running on a 50 per cent basis, although a few owing to rush orders, have more men working.

A considerable amount of business is now being done by the bridge companies among counties in construction of new bridges. Over 50 such structures have been let or will be let this summer. The percentage of concrete structures is apparently increasing.

The state of Pennsylvania has let contracts for the new ventilation system in the capitol to the B. F. Sturtevant Co., of Philadelphia, and for a garbage disposal plant to the Dixon Engineering & Construction Co., of Toledo.

In New Offices.—The offices of the Jones & Laughlin Steel Co., Pittsburg, are now located in the elegant eight-story building, especially erected by the company at Third and Ross streets. The new building is admirably arranged for the administrative activities of the company, the entire eight floors being devoted to the various departments.

The Atkinson Foundry & Car Shops, St. Albans, W. Va., recently organized with a capital of $25,000, has let contracts for erecting a saw tooth frame building 98 x 128 feet and car shop 40 x 80 feet, and other small buildings. Contracts have also been awarded for the mechanical equipment necessary, wood working machinery and sheet metal tools.

RAILWAY MASTER BLACKSMITHS' MEETING.

The International Railway Master Blacksmiths' Association held its sixteenth annual convention at the Grand Hotel, Cincinnati, Aug. 18 to 20. The meeting was called to order by President G. H. Judy, and welcomed by Mayor Markbreit. W. W. McClelland responded, and President Judy then delivered his address, in which he outlined the progress made by the association during the year, and called attention to the death of several prominent members.

Following the presidential address, the committee on tools and formers presented its report, which was read by G. M. Steward. The committee advocated the presence in large shops of a master workman, whose duty it would be to assist in the making and repairing of dies and formers. The report describes some special tools used in various railroad shops for special jobs. The discussion on this subject was voluminous and consumed the remainder of the morning.

At the afternoon session, the committees on flues and case hardening reported. The report on flues, presented by Jos. Northend, gave a table showing the cost of various operations of welding and handling flues. The discussion on case hardening was spirited and interesting. Following this, a paper on piece work was presented, on which there was no discussion. Then followed a number of papers on welding locomotive frames, both by the thermit and ordinary method.

The Wednesday morning session was occupied by routine business, and by the continuation of the discussion on thermit and frame welding. Twenty-three new members were admitted to the association.

The Thursday morning session was devoted to papers on frogs and crossings, high speed steel and the result obtained with it, and the meeting then took up new business. The following officers were elected: J. W. Russell, Renova, Pa., president; George W. Kelly, Elizabeth, N. J., first vice president; John Conners, Montgomery, Ala., second vice president; A. L. Woodworth, Lima, Ohio, secretary and treasurer; G. H. Williams, Boston, Mass., chemist, and J. S. Sullivan, Columbus, Ohio, chairman of executive board. Niagara Falls was chosen at the place for the next meeting.

Daft, Heyward & Co., Frick building annex, Pittsburg, dealers in pig iron, alloys, coal and coke, have dissolved and have been succeeded by Thomas R. Heyward & Co. Mr. Heyward will conduct the business as in the past, A. C. Daft, who was associated with him, having retired to devote his attention to the handling of alloys.

ERECT NEW BUILDINGS

To Replace Part of Old Spang-Chalfant Plant at Etna, Pa.

Spang-Chalfant & Co., Inc., Pittsburg, manufacturers of wrought iron and steel pipe and boiler tubes, are about to begin the erection of a new building for the rolling mill of their large works at Etna, Pa. The new building will be of modern steel construction, in two bays and will afford practically the same floor space as the present structure which it replaces. Some improvements in equipment in the way of cranes, will be provided in connection with the new building.

The supplanting of the present rolling mill building involves the removal of a quite historic structure. The building was erected in 1828 by H. S. Spang, grandfather of C. H. Spang, of the present company, and it marked the original investment of what has developed into the extensive works today of the Spang-Chalfant Co. It was especially well-built, having successfully withstood all these years the repeated floods to which the community in which it is located, has been subjected. The Spang-Chalfant Co. has also just completed the erection of a new power house in which it will concentrate the power equipment for its entire works. The new plant is located upon high ground beyond the reach of any flood.

Will Rebuild.—The Enterprise Foundry Co., Sackville, N. B., advises that it has practically decided to rebuild on the site of the old plant recently destroyed by fire. The company proposes to equip the new foundry with all the latest improvements so as to make it as nearly as possible the model stove foundry on a modest scale. The buildings will be of brick and all one story. The power house, which stands in the center of the site, with a powerful engine and boiler equipment was saved from the recent fire, and will form the nucleus around which the new buildings will be grouped.

Will Make Gas Engines.—The Wisconsin Engine Co., Corliss, Wis., announces that it has engaged in the manufacture of gas engines for all purposes, in addition to high duty Corliss engines and pumping engines, including gas engines in units up to 5,000 horsepower. Charles E. Sargent has been associated with the company as the engineer of the gas engine department, he being the inventor of the horizontal tandem double gas engine.

OBITUARIES.

John J. O'Brien, aged 37 years, boiler manufacturer and member of the city council, died at St. Louis Aug. 20.

F. A. Dilworth, assistant general manager of sales, Tennessee Coal, Iron & R. R. Co., at Birmingham, died there Tuesday Aug. 25, after a week's illness. He was formerly sales manager of the Carnegie Steel Co., at Atlanta.

William Weihe, for 10 years president of the Amalgamated Association of Iron, Steel & Tin Workers, died at his home in Pittsburg, Aug. 24, aged 64 years. He was elected president of the Amalgamated association at the Philadelphia convention in 1882, and served in that capacity until 1892, when he resigned during the Pittsburg convention. He was appointed United States immigrant inspector at Ellis Island station, New York City, and while active at his duties was stricken about a month ago, returning home and finally dying. He was elected a representative to the state legislature from the South district of Pittsburg in 1883, serving one term. He leaves a widow, a son and daughter. Mr. Weihe was president of the association during the Homestead strike. His years of administration as head of the iron workers' organization were characterized by strong and conservative management.

PERSONAL.

Chas. A. Vogt, auditor of the American Steel & Wire Co., Cleveland, has returned from a trip to Europe. He was accompanied by Mrs. Vogt.

John Daker Jr., beginning Sept. 1, will represent the Domhoff & Joyce Co., Cincinnati, in Detroit territory. Mr. Daker is at present the representative of Hickman, Williams & Co., in that territory.

Herbert Black, formerly secretary and treasurer of the Robert Field Co., Cincinnati, has become associated with Hickman, Williams & Co., Cincinnati.

Baylor Hickman, of Hickman, Williams & Co., Cincinnati, who has been abroad for several months, sails for home on August 29.

E. M. Allen, vice president and general manager American Refractories Co., Joliet, Ill., has just returned from a five months' stay in Austria and Germany.

Arthur Lucien Walker has been appointed administrative head of the department of metallurgy in the school of engineering at Columbia University, taking the place of Prof. Howe, who will continue his lectures on iron and steel, but who will devote more time to research. Prof. Walker was graduated from Columbia in 1883, and has been connected with several engineering concerns.

Joseph G. Butler Jr., of the Brier Hill Iron & Coal Co., Youngstown, O., has completed a motor tour through rural England, and sailed for home Aug. 21 on the Amerika.

H. L. Mills, formerly in the sales department of the Whiting Foundry Equipment Co., has resigned to accept the presidency of the American Specialty Co., 1440 Monadnock Bldg., Chicago.

Edward Schwartzburg has been named manager of the Milwaukee plant of the National Enameling & Stamping Co., to succeed Ferdinand A. W. Kieckhefer, who recently was elected president of the corporation. Mr. Schwartzburg entered the employ of the Kieckhefer Bros. Tinware Co. 20 years ago as office boy.

Big Coal Transaction.—A large transaction has been closed whereby J. V. Thompson, of Uniontown, Pa., has transferred 5,200 acres of undeveloped coal territory located in the northeastern part of Greene county, Pa., to the Emerald Coal Co. of Pittsburg. Julian Kennedy, a well known engineer of Pittsburg, is president of the Pittsburg company. Coal from this territory is of good coking quality and extensive plans are well advanced for the erection of coke ovens and the operation of mines on the property.

Signed Wage Scale.—Brown & Co., operating the Wayne Iron Works, Pittsburg; Granite Iron Rolling Mills, St. Louis, and the Pope Tin Plate Co., Steubenville, O., are the latest signers of the iron and tin scales of the Amalgamated Association of Iron, Steel & Tin Workers.

Thos. H. Watkins, of Scranton, Pa., has been appointed receiver of the Pennsylvania Coal & Coke Co. upon the application of the Scranton Trust Co., trustee for the consolidated bondholders. It is declared that the company is unable to meet its rental obligations. The company is capitalized at $5,000,000 and owns over 100,000 acres of bituminous coal lands in western Pennsylvania.

D. J. Sinclair, of Steubenville, is reported to be promoting a company to erect a plant at Follansbee, Pa., for the manufacture of steel tanks. Options have been taken on a tract of land upon which the plant will be erected if the organization plans are successful.

GENERAL IMPROVEMENT

In Industrial Conditions in the Buffalo District.

Buffalo, Aug. 24.—Conditions of the iron and steel industry in the Buffalo district are encouraging in all quarters because there has been, during the past few months, a general improvement in the different lines which is gradually and surely becoming a betterment of the substantial kind. No plants have been operating at full capacity and in several cases they fell below 50 per cent, but now the general trend is upward and there is a great deal of confidence that the low mark has long since been past. Lately a few concerns have found it possible to operate a certain part of their works at full capacity and some with day and night shifts, although this condition was only temporary.

Talks with officials in the iron and steel business in this locality show nothing like the depression of earlier months. If there was such a condition, it has disappeared and, while they are open for considerably more business, they feel a certain relief in the steady improvement. Most of them predict a big gain in orders and output before many weeks have elapsed. In fact, it seems to be pretty generally feared that when the business does break it will come upon them with an embarrassing rush.

The works of the Lackawanna Steel Co., the largest industry in this district, is a good barometer of local conditions. This plant has pushed ahead and is now operating 60 per cent of full capacity, a gain of 30 per cent over two months ago. The improvement at the Lackawanna has given impetus to trade conditions in Buffalo. The improvement has been a gradual, progressive, upward movement. Some of the mills are being run double time one week and single the next in accordance with orders. This applies to all classes of material.

Developments with the New York State Steel Co., one of the new plants in Buffalo, are quiet and the reorganization plan is being worked out. Officials of the company are not prepared to say when the plant will be turned over again. For several months prior to Aug. 1, the mills had been working short time to finish raw material on hand. With the Seneca Iron & Steel Co., whose plant was started running last year, conditions are satfactory. The plant has five mills, three of which are now in operation, which is an increase of one since early in the year. Much activity is looked for later in the year.

The Lake Erie Boiler Works of this city is now running full time and has orders which will insure operation for several months. At the Lake Erie Engineering Works conditions are about the same as earlier in the year, so far as the foundry and machine shops are concerned, but heavier business is expected.

WEST END STACK HAS BEEN PRACTICALLY REBUILT.

The West End Furnace Co., Roanoke, Va., put its blast furnace in blast Aug. 18, after having completed improvements at the plant costing about $100,000. The furnace has been relined, a David-Baker top with an Otis automatic elevator engine and a new skip way installed, new bosh and hearth jacket have been put in, and a new tuyere breast with complete fittings. The stoves have been relined and equipped with new hot blast valves of the mushroom type. Blowing engines have been thoroughly overhauled, and new condensers and Cochran heaters added. The boilers have been completely rebuilt, new steam lines put in, and the water supply increased by adding two pumps to the plant. The stack now has a 10-foot hearth, 16-foot bosh, and is 80 feet in height, and has a daily capacity of 150 tons.

New Mining Enterprise.—The Puxico Mining Co. of Puxico, Stoddard county, Mo., is a new mining enterprise for southeast Missouri. The interested parties are T. J. St. Louis, of Puxico, and Otto Riesenweber, of Menasha, Wis. These gentlemen have acquired an extensive bed of iron ore covering 40 acres with an average depth of 27 feet. They are now installing a crushing and washing plant of 150 tons daily capacity, and will be in market with clean ore by Oct. 1. This property is located near the Frisco main line. They are building a spur track into the mine, so that the work may not be interrupted during the wet season.

Chinese Iron Mines.—The Tayeh iron mines in China contain about 273,000,000 tons of iron ore. They are about 70 miles below Hankow on the Yangste and comprise an area of 35 square miles. Lion Hill, now being worked contains 150,000,000 tons of ore. It is taken by rope tramway to Shih-liu Yao, about eight miles distant, where it is stored for shipment. The average iron content is about 65 per cent.

PRACTICAL MEN

Take Over Control of Rolling Mill at Elmira, N. Y.

The Elmira, N. Y., rolling mill has been taken over by Edwin Ball and George H. Lowe, and in a short time will be re-opened under co-operative management. Both Messrs. Ball and Lowe are practical rolling mill men from the Mahoning valley, Mr. Lowe at one time having been superintendent of the Mahoning Valley works of the Republic Iron & Steel Co.

The Elmira works are located at Elmira Heights, and include one double puddling furnace, two single puddling furnaces, four busheling furnaces, two coal heated furnaces, three trains of rolls, including one three-high 18-inch muck, one 10-inch and one 16-inch Belgian finishing mills. The product of the mills has been in the past merchant bar iron, including rounds, squares, flats, bands, hexagons, etc., horseshoe, rivet and staybolt iron, the annual capacity being estimated at 15,000 tons. The mill was originally built in 1902 by the Elmira Rolling Mill Co., and first was put in operation in September of that year. On Nov. 1, 1906, the works were leased by the Federal Rolling Mill Co.

TO SEE COKE MADE.

A demonstration of the manufacture of foundry coke will be afforded the members of the Pittsburg Foundrymen's Association, Sept. 7, by the Jamison Coal & Coke Co. at its three plants at Crabtree, Pa., Hannastown, Pa., and Luxor, Pa. The Pittsburg foundrymen as the guests of the Jamison company will spend the day at these plants, and will be privileged with witnessing the complete process of the manufacture of 72-hour coke, as well as the mining operations, if they so desire. The party will be taken to and from its destination by a special train leaving Pittsburg at 8 o'clock, and on the return trip lunch will be served on board by the Jamison company. A large crowd is expected to make the trip.

Build New Stack.—The Youngstown Steel Co., Youngstown, O., is tearing down the old furnace stack and clearing the yards for the erection of a new 350-ton furnace, together with coke and ore bins and other improvements. The W. B. Pollock Co., Youngstown, has the contract for the erection of the new stack, which it is said will be ready to blow in about Dec. 1.

HUGE POWER CONTRACT

Awarded by Canadian-Niagara Falls Power Commission.

Toronto, Canada, Aug. 22.—The Hydro-Electric Power Commission, the body having charge of the work of distributing electric power from Niagara Falls to municipalities in western Ontario, has awarded the contract for the construction of transmission lines to the F. H. McGuigan Construction Co., for $1,270,000. The contract covers 293 miles of lines between Toronto and St. Thomas. There were 27 tenders, including several American and British competitors, but Mr. McGuigan's was the lowest. The work is to be completed within 15 months.

The steel towers, 3,176 in number, will be supplied by the Canadian Bridge Co., Walkerville, Ont., and the Ontario Iron & Steel Co., Welland, and will consume 6,554 tons of steel. The cables will be of aluminum wire, weighing 1 014,209 pounds, which will be supplied by the Northern Aluminum Co. of Shawenigan Falls, Que. For double telephone lines over the right of way 140,000 pounds of wire will be required. Mr. McGuigan, the successful tenderer, is a prominent railroad man and was fourth vice president of the Grand Trunk system for some years, afterwards accepting the position of first vice president of the Great Northern.

An action brought on behalf of the Dominion Iron & Steel Co. of Sydney, N. S., to upset the title of the Dominion Coal Co. to submarine coal areas at Point Aconi, Cape Breton, has been decided by Judge Russell, of Halifax, in favor of the coal company. The steel company obtaind an option on other coal areas situated beyond those of the coal company, and having no working connection from the shore otherwise than through the coal company's holdings, the action was brought by Mr. Burchell, who at present holds the title, on the ground that the coal company's areas were not properly designated in the leases they held. The decision will render the option practically valueless to the steel company so long as it remains at variance with the coal company.

The Canadian government has appointed a board of expert bridge engineers to prepare plans for the reconstruction of the Quebec bridge, consisting of Henry E. Vautelet, C. E., Montreal; Maurice Fitz Maurice, C. M. G., of London, Eng.; and Ralph Mojeski, Chicago. These were selected as the best available in their respective countries. Mr. Vautelet, who will be chairman of the board, was for some years bridge engineer for the Canadian Pacific Railway Co., and until recently was in general practice in Montreal as a consulting engineer. Mr. Fitz Maurice is chief engineer for the London county council, and was in charge of the construction of the great Assouan dam in Egypt. Mr. Mojeski, the American representative, is a member of the American Society of Civil Engineers and one of the most eminent bridge experts on the continent. The board will begin their work as speedily as possible and will first examine the present piers and site to see whether they can be made available for the new bridge. The existing substructure and material on hand, valued at nearly $3,000,000, are now the property of the government in return for their assuming the bond indebtedness of the company.

INCREASE WORKS CAPACITY.

The Bollinger-Andrews Construction Co. has under way extensive improvements to its plant at Verona, Pa., which will materially increase the capacity of its works. A principal feature of the new construction is that of a steel frame foundry 130 x 320 feet which will be sufficient to supply the castings required by the company. The equipment of the foundry will include two 84-inch Whiting cupolas with a daily capacity of 250 tons, a Whiting electric elevator, a number of ladles and a No. 6 Piqua positive pressure blower furnished by Samuel W. Hayes & Son, Pittsburg, three Morgan electric cranes and other modern machinery. Two 175-horsepower Westinghouse gas engines direct connected to 100-kilowatt Westinghouse generators will supply electric power to the individual motors used in the foundry. The structural steel department of the company is also being enlarged to a capacity of approximately 3,500 tons monthly. The company is now working upon a number of steel construction contracts.

Returns to the Ontario bureau of mines of the output of the mines and metalliferous works of the province for the first three months of 1908 give the production of iron ore as 24,572 tons of the value of $66,423, and pig iron, 90,826 tons, value $1,469,779.

STEEL BRIDGE PLANT PROPOSED FOR DETROIT.

In the transfer of the title to 7½ acres of land at River Rouge, Mich., near Detroit, to H. C. & F. X. Burke, the first formal steps were taken to obtain a site for a $300,000 plant to be known as the Detroit Bridge & Steel Co. The company is now in process of organization under the direction of M. J. Towler, 444 Vinewood avenue, Detroit. Mr. Towler was formerly manager of the Detroit branch of the American Bridge Co. He has been quoted as saying that upon the River Rouge site, which parallels the Michigan Central freight distributing routes, will be built a bridge plant and structural steel plant, together with a machine and repairing shop. Mr. Towler also announces that the main purpose of the organization will be to build railroad bridges, and of course, fabricate structural steel and at the same time, do dredging and other machinery repairing. Further announcement is made that plans and specifications for the construction of the plant are being drawn up, and that construction will begin within two months, with a view to operating the manufacturing plant next spring.

BUILT BIG ADDITIONS.

The John F. Byers Machine Co., Ravenna, O., has just built and fully equipped a new erecting and assembling shop, blacksmith and forge shop, iron and brass foundry, together with a fireproof pattern storage building, involving an expenditure of about $60,000. The company manufactures a line of single and double steam hoisting engines, derrick cars, derrick irons, steel blocks and sheaves, together with special tools for heavy contract work. Its business comes principally from railroad, canal and building contractors. The additional building has been made, the officers of the company advise, in anticipation of normal trade for the coming year, noting that while the outlook for the remainder of this year is not flattering, yet considerable inquiry has been received from contractors in different sections of the country. With the present condition of the plant, the company is in a position to handle an output 50 per cent greater in volume than that of 1907. During that year, the company was unable to fill the orders which came to it practically unsolicited.

The blast furnace of the Zenith Furnace Co., Duluth, will be blown in Sept. 1.

ADDITIONS TO THE PLANT OF THE INLAND STEEL CO.

A New Merchant Bar Mill Especially Designed to Promote Flexibility—Will Use Open-Hearth Steel Entirely—New Blooming Mill, Sheet Bar Mill and Boiler House

Through the several years since its formation, the Inland Steel Co. has been gradually developed into a very complete open-hearth steel plant by the successive addition of new facilities, not of notably large capacity in any one department, but taken altogether, of considerable extent. The last important project in the present scheme for the complete plant, a semi-continuous merchant bar mill built by the Morgan Construction Co., Worcester, Mass., was finished and placed in operation this month. This mill represents not only the latest developments of its type, as embodied also in the similar mill installed by the Wisconsin Steel Co. some years ago, but in addition especially provides for unusual flexibility through an arrangement of the rolls, unique with this plant.

To meet the demand for increased rolling capacity which has come with the growth of the steel plant in this and other directions, other improvements have been simultaneously in progress, including the installation of a 36-inch blooming mill and a 24-inch sheet bar mill. Additional boiler capacity has also been added, consisting of eight 500-horsepower Stirling boilers with the necessary buildings and coal handling apparatus. Another improvement completed a month or so ago was the building of a hot metal tunnel from the blast furnace under the tracks of the Lake Shore & Michigan Southern and the Baltimore & Ohio railroads to the open-hearth department. This enables the mill to change over from cold metal brought from a casting machine to the much more advantageous molten iron. To what status the above additions have brought this steel plant at Indiana Harbor, Ind., may be briefly indicated by a resume of the present layout. This includes one blast furnace with a daily capacity of 400 tons; six 50-ton open-hearth furnaces with accessory soaking pits; one 36-inch, two-high blooming mill; one 24-inch sheet bar mill; one 24-inch universal mill, rolling up to 13-inch car channels, 8-inch I-beams, 7 by 3½-inch angles and all shapes in bars up to equivalent sizes; 10 sheet mills, rolling up to 52 inches wide with eight annealing furnaces, two galvanizing pots and corrugating machinery; one 60-inch light plate mill and one continuous merchant bar mill with 14-inch, 11-inch and 8-inch roll trains. In addition to this mill capacity, are the various accessory and auxiliary plants, including a roll shop and boiler house, and there is to be installed a 12,000,000-gallon pumping plant using Nordberg condensing pumps, which will give to the steel plant direct from the lake an ample water supply. The steam plant, enlarged by the addition of eight additional units heretofore mentioned, now contains 22 500-horsepower Stirling boilers with room for six more.

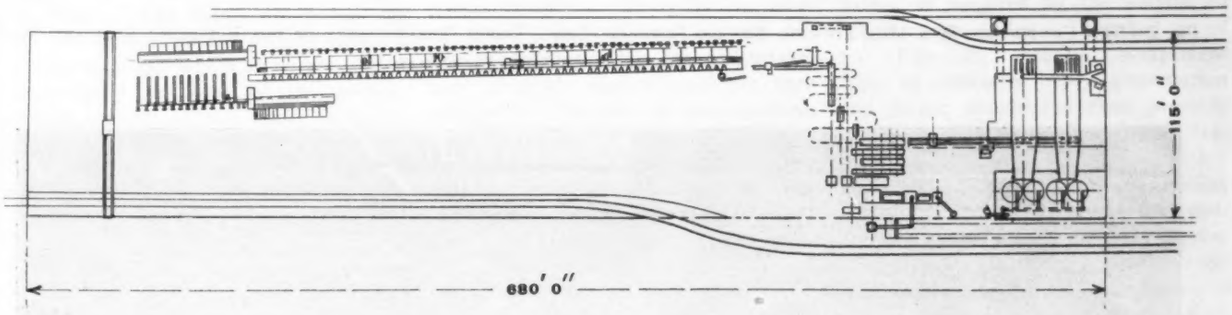


FIG. 1—PLAN OF INLAND STEEL CO.'S NEW CONTINUOUS MILL.

The Semi-Continuous Merchant Bar Mill.

The new semi-continuous merchant bar mill has, as mentioned above, a unique arrangement of its rolls. In Fig. 1 the layout of the plant is indicated, as is the course of the billet through the rolls. The roughing mill consists of but six trains instead of seven or eight, as has been the practice. The No. 7 train is located beyond and a little to one side of this continuous train and the remainder of the rolls are arranged in similar relation to it. By means of this arrangement, a largely increased flexibility in rolling the bar is obtained. This layout is also shown in Figs. 2 and 3, which are views in the mill building. The mill is designed to finish from ⅜-inch to 1½-inch rounds or equivalent sections including flats, angles, channels, etc. The mill building is of standard steel mill building construction, 115 x 700 feet, with monitor roof and vertical side lights. In addition to the roof lighting, the end walls are entirely glass enclosed, as are the side walls above the crane runway. The main wall construction will be of paneled concrete.

Fig. 2 is a view looking toward the furnaces, which are also shown more clearly in Fig. 4. They are two in number, of the Morgan continuous, gravity discharge type with water cooled skid pipes which are slightly inclined toward the front to assist the movement of the billets. The billets are worked along by the pusher to the hottest part of the furnace at the discharge end, from which they drop through swinging doors in the front of the furnace directly onto a billet conveyor. The concrete foundation of the furnace in front and the slide or apron on which the billet is discharged into the conveyor is so designed as to cause practically all

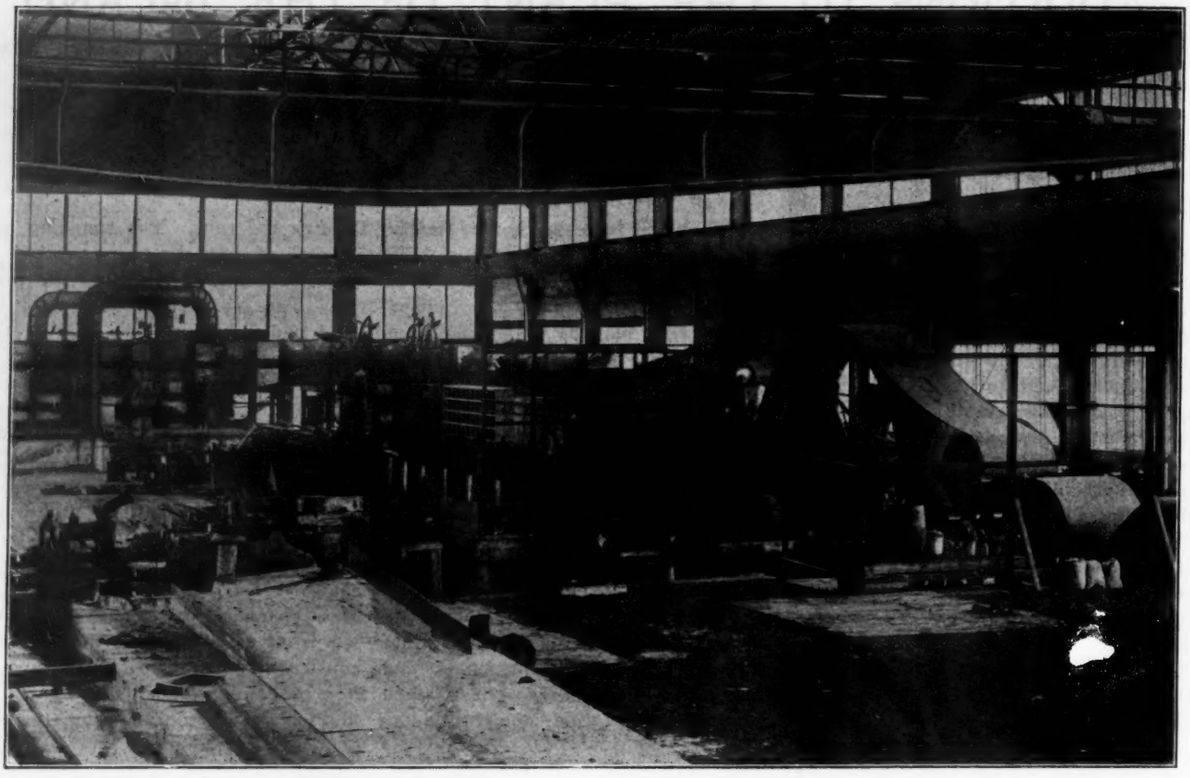


FIG. 2—NEW CONTINUOUS BAR MILL LOOKING TOWARD FURNACE END. SHOWS ARRANGEMENT OF THE ROUGHING SETS AND NO. 7 AND NO. 8 ROLLS TO PROVIDE FLEXIBILITY.

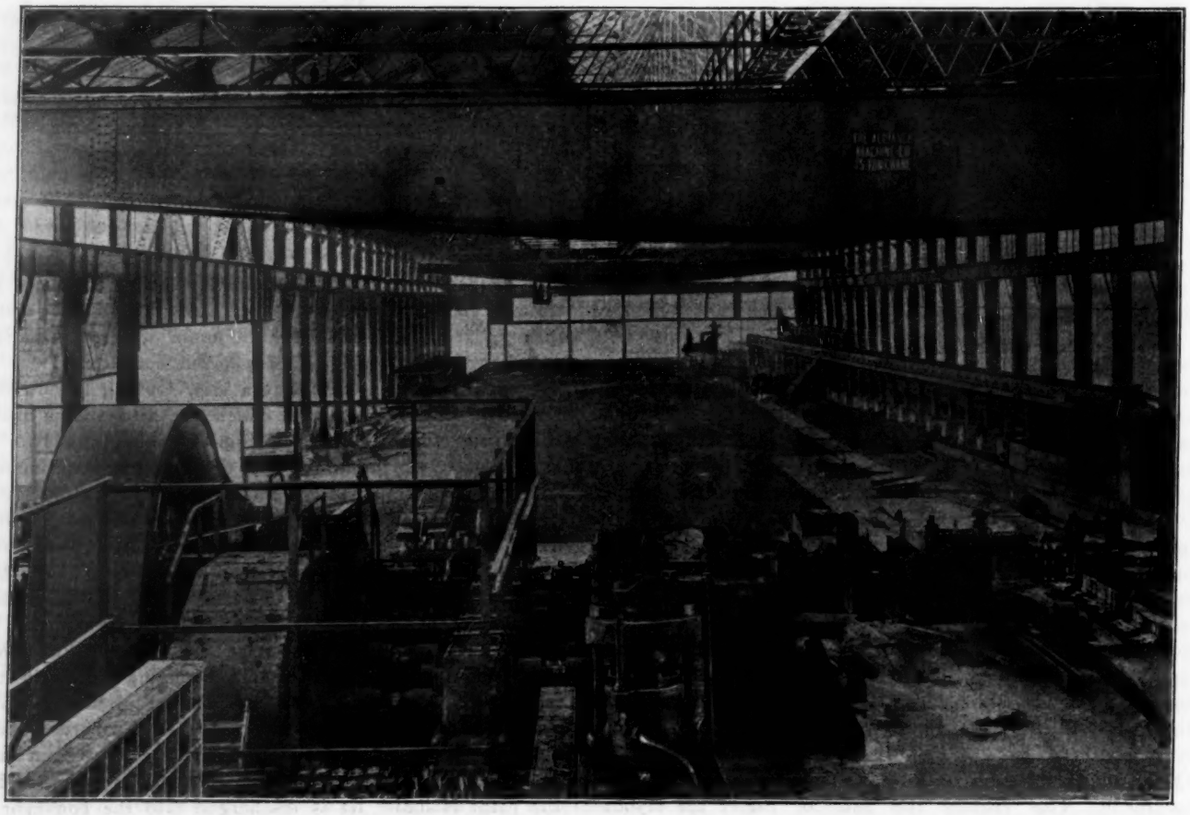


FIG. 3—CONTINUOUS BAR MILL FROM FURNACE END, LOOKING TOWARD STRIPPING FLOOR AND COOLING BEDS.

of the scale to drop through into a pit below, where it can be removed in quantity as it accumulates. This prevents the scale from distributing itself along the conveyor. The furnace is provided with reversing regenerators. The air blast is furnished by two Sturtevant fans, each supplied with a self-contained motor. The gas is supplied from a battery of four 10-foot Morgan gas producers, fitted with George automatic feeders located directly in front of the furnaces as shown in Fig. 4. As partially indicated in this view, the gallery for feeding the producers is also used for coal storage and has a capacity just sufficient for the current supply. The coal can be shoveled directly from cars on the track just outside of the building to this floor.

The mill will use 4 x 4-inch billets and the furnaces are designed to receive these billets in lengths up to 11 feet. Shorter lengths and material of smaller cross-section may be used, however. The billets are delivered to the back of the furnaces on narrow gage cars that are run in on tracks entering the building, as shown in Fig. 1. The billets are picked up by cranes and placed on the inclined platform along which they are rolled individually in front of the pusher, which consists of two heavy swinging arms operated by a steam cylinder located under the platform. This arrangement is much more compact than that in which direct plunger pushers are used.

From the furnace the heated billets are carried about 40 feet by a conveyor of the ordinary type to the continuous roughing rolls. This conveyor is divided into two sections by a hydraulic shear, which is fitted with an adjustable stop to permit of cutting the billets into any length from 30 inches to 60 inches. The roughing set is composed of six trains of 14-inch rolls which together with No. 7 train, are driven by spur gears direct connected to the engine shaft. A repeater turns the rod back into No. 7 train, which is a pair of 14-inch rolls. A similar repeating arrangement carries the rod from No. 7 to No. 8 train, which likewise carries 14-inch rolls. Drag rolls are placed between the roughing set and No. 7 and between No. 7 and No. 8 to assist in the handling of the rod. As mentioned above, beyond and to one side of No. 8 is an 11-inch train containing stands 9, 10, 11 and 12, driven from the engine through a stand of three-high pinions. Leaving No. 8 train, the rod is allowed to run clear

FIG. 4—DISCHARGING END OF HEATING FURNACES, SHOWING FEEDING HOPPERS FOR MORGAN GAS PRODUCERS.

and, with a drag roll to assist, is fed into No. 9, the last end to leave No. 7 being the first end in. A few feet farther on, are two more trains, each with one stand of two-high 8-inch rolls and their separate pair of pinion housings. There is no manual labor from the time that the billet is placed on the furnace pusher until after the eighth pass has been completed. The four or six remaining passes cover such an unlimited range and varying conditions as to render automatic working impracticable. The smaller sections are finished by looping in the first end and the heavier sections are allowed to run clear.

Cooling Bed.

From the mill, the stock passes directly to the cooling bed. The location of this bed with respect to the mill is shown in Fig. 3, the bed being at the extreme right. The design and mechanism of the bed are shown in Fig. 5. The cooling bed is 300 feet long and is arranged so that it may be operated as a whole or in halves as required by the lengths of the sections rolled. This bed is of the Edwards, inclined, escapement type, of unusually heavy construction and larger dimensions than previous installations. A number of new features are also involved. The bar mounts to the top of the bed, being pulled up by a drag roll on the cooling bed and passes along the top over a conveyor consisting of conical rolls whose axes are set slightly oblique to the conveyor axis. The bar is thus kept at the large end of the roll and at a maximum speed. When the entire

FIG. 5—ESCAPEMENT TYPE COOLING BEDS, LOOKING TOWARD BAR SHEAR.

bar is on the bed, the axes of the cone rolls are shifted slightly into the right angle position by means of a lever and connections that operate all the rolls simultaneously. The bar instantly crosses the face of the rolls to the small end and consequently to slow speed. The bar now lies directly over the top fingers of the transverse conveyor and is at once lifted from the cone rolls and slid broadside into the first notch of the cooling bed down which it travels notch by notch as the bars of the cooling bed are reciprocated and as subsequent bars are received. The

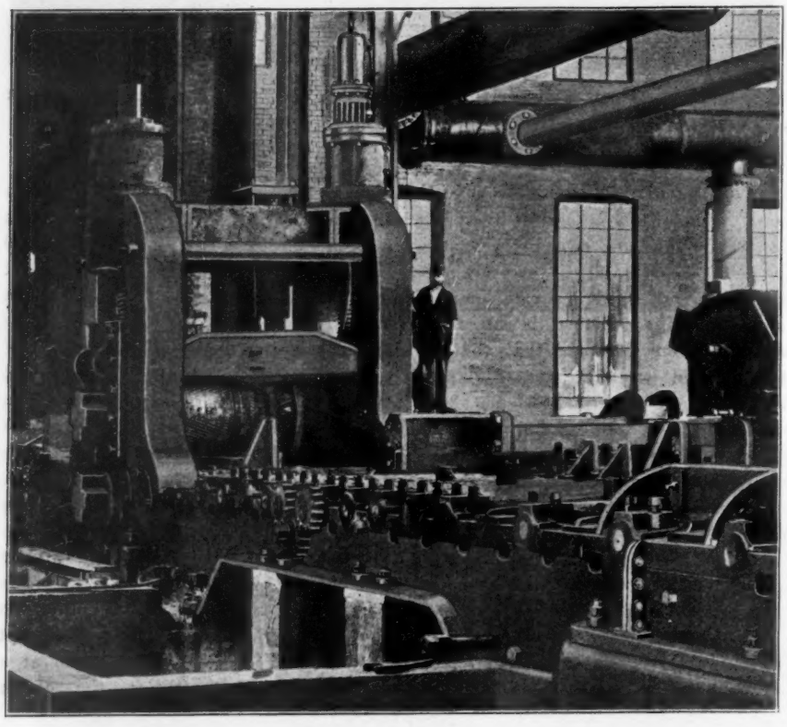


FIG. 6—NEW 36-INCH BLOOMING MILL IN COURSE OF ERECTION. INSTALLED AND OPERATED WITHIN ONE MONTH OF SHUTTING DOWN OLD MILL.

device at the bottom for bunching the bars for preliminary shearing is likewise new and consists of a series of supports in pairs. These supports are operated by cams on a lay shaft alongside of the conveyor and with the rotation of the cams the supports raise and lower alternately, giving a progressive impulse to the bar, which carries it toward the conveyor rolls.

This conveyor carries the bars directly to a shear at the end of the cooling bed as shown in Fig. 5, where the bars are cut to any desired length. This shear is equipped with a 60-foot back shear table with positive driven rolls in gear with those in front and fitted with an adjustable stop. As the rods are cut to length, a series of pusher arms, constituting a kick-off, deposits them at the side of the table in a pocket resting on the platform of a standard Howe track scale. After a sufficient bundle has been accumulated, it is transferred by one of the overhead cranes either to the railroad cars directly or to some part of the shipping floor. If the specifications call for rods to be cut to very short lengths, the one shear mentioned could not handle the product of the cooling bed with sufficient rapidity to take care of it. A second or reshearing shear, together with a short conveyor and 40-foot back shear table and with gage and pockets identical with those of the other shear, is provided. The first shear can then supply the material cut to some multiple of the finished length and these long bars are transferred to the skids from which they are fed to the reshearing shear. A heavy United Engineering & Foundry Co. scrap shear is also installed.

As indicated in the general view, Fig. 3, ample area has been devoted to the shipping floor in order to provide every facility for the handling of material. A shipping track is run into the building parallel to this shipping floor and with the tracks sufficiently below the floor level to make the handling of the material into the cars easy. There is sufficient trackage within the building to accommodate 10 cars simultaneously. The crane service consists of two 15-ton Alliance Machine Co. cranes, which traverse the entire length of the building and have a span of 111 feet 6 inches. The height from floor to top of crane runway is 23 feet 6 inches and from the top of the rail to the bottom chord of the trusses 8 feet 6 inches.

Driving Arrangements of Mill.

The mill is driven by a 32 x 56 x 60-inch tandem compound C. & G. Cooper Corliss engine, the engine room being enclosed from the mill by galvanized sheeting. The driving of the mill is done by a unique arrangement of the main shaft and two jack shafts. The main shaft carries the band wheel, from which the belt is run over an idler, then back and under one jack shaft pulley and then up and over the second jack shaft pulley, from the under side of which it returns to the band wheel. This is shown in Fig. 2. The main shaft is direct connected through a coupling to a train of spur gears which drive the first seven stands of the mill. The finishing trains are driven by the jack shafts.

The mill is rated to have a capacity of 300 tons a day and the product will be entirely open-hearth steel. The new 36-inch blooming mill is a two-high mill built by the United Engineering & Foundry Co. and is shown in course of erection in Fig. 6. Something of a record was made in tearing out the old mill and installing the new one, the entire transition being accomplished in about 30 days. Removing the old mill involved taking out the old engine as well and blasting out the former concrete foundations. New foundations were put in inside of sheet piling driven 8 feet into the sand. The new mill is reversing, with manipulators on both sides of the mill. The twin driving engine is 50 x 66 inches, built by the Mesta Machine Co. The new 24-inch sheet bar mill is a three-high and replaces a bullhead. It is driven by a 38 x 72 x 60-inch tandem-compound Mesta engine. The eight additional Stirling boilers are equipped with Green Engineering Co. stokers and Heyl & Patterson coal handling machinery and with a Link-Belt ash conveying system.

THE PRODUCTION OF MALLEABLE CASTINGS.---VI

Work of the Pattern Shop, One of the Most Important Departments of the Malleable Foundry.

By Richard Moldenke

One of the most important departments of the malleable works is the pattern shop. When compared with the ordinary gray iron foundry, the product of the malleable shop is very light and the number of castings made from practically every pattern is enormous. Hence every refinement in patternmaking for light castings is found in this branch of the foundry industry. A modern pattern shop for this purpose would therefore be equipped with the usual wood working machines, as well as individual wood trimmers and other labor saving devices for each bench; and also have every facility for metal patternmaking as part of the installation. Thus a vertical universal milling machine will be found indispensable where accurate and quick work is to be turned out. The pattern shop in fact becomes a foundry for white metal castings, a tool room, machine shop and model works all combined. It naturally takes a high order of shop executive to conduct such a department successfully, and hence we find many a superintendent a graduate from the pattern department of a malleable works.

When a blue print or pattern comes in, a careful study is made to see just how much it will pay to spend upon the pattern end in order to turn out the job in the cheapest way. Every shop has its own experience in this regard, and concerns that send out patterns are sometimes puzzled to learn that their patterns are gated wrong; that it will cost so and so much to set things straight, or that unless permitted to change the pattern or the grouping of the individual pieces, the price quoted would be advanced.

Ordering Castings.

Large consumers therefore have adopted the method of ordering their castings simply by blue print, the works to make and keep the pattern. This, while a little hard on the shop taking the order, is the most satisfactory in the long run, as it puts the whole matter strictly up to the management to make good. There is a good deal of give and take in this, and the result is sometimes a loss on the order.

For example, the writer remembers having had a contract from a great railway system by the terms of which blue prints would be sent in, and castings ordered at a certain price a pound, regardless of the number of castings, works to make all patterns. A very intricate job was made under this arrangement, the pattern work on which amounted to many hundred hours, but only seven castings weighing some 100 pounds apiece were required. The price paid was just short of 3 cents a pound. On the other hand, very many times under that same contract, an order called for 20,000 castings, some 15 pounds in weight, without change of pattern. Another very good arrangement is sometimes entered into, and that is keeping stock for a customer until

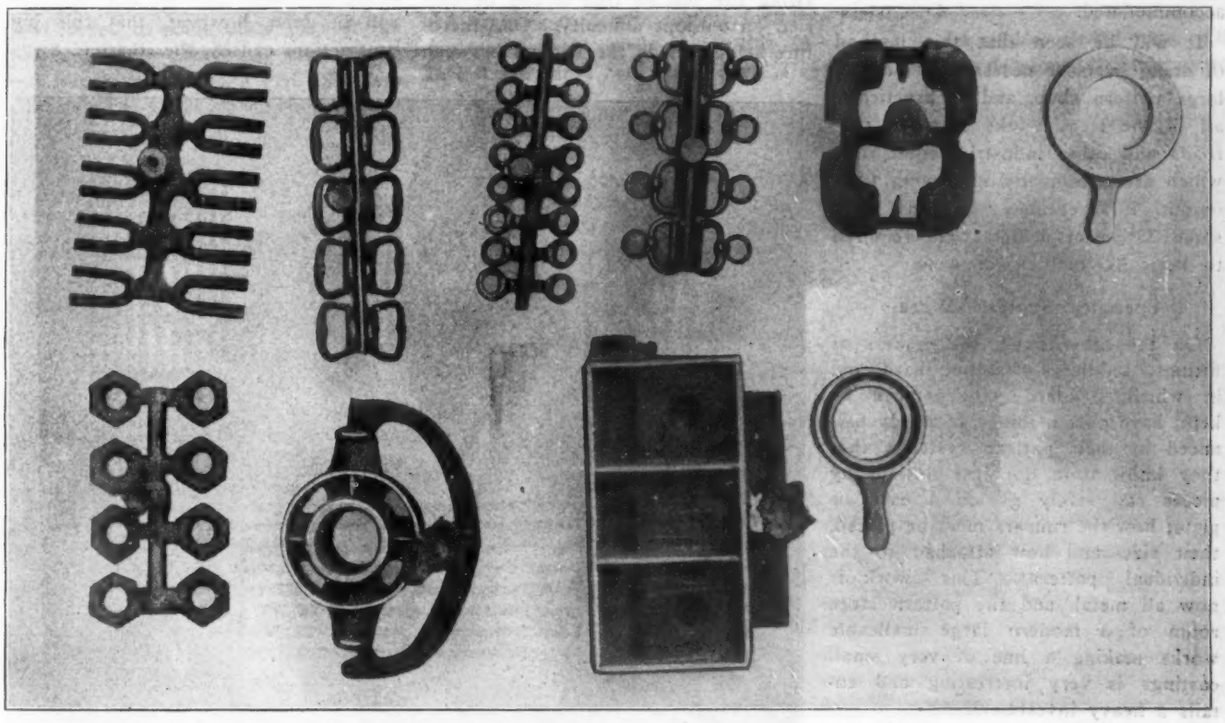


Fig. 1—Miscellaneous Malleable Castings Showing Methods of Gating

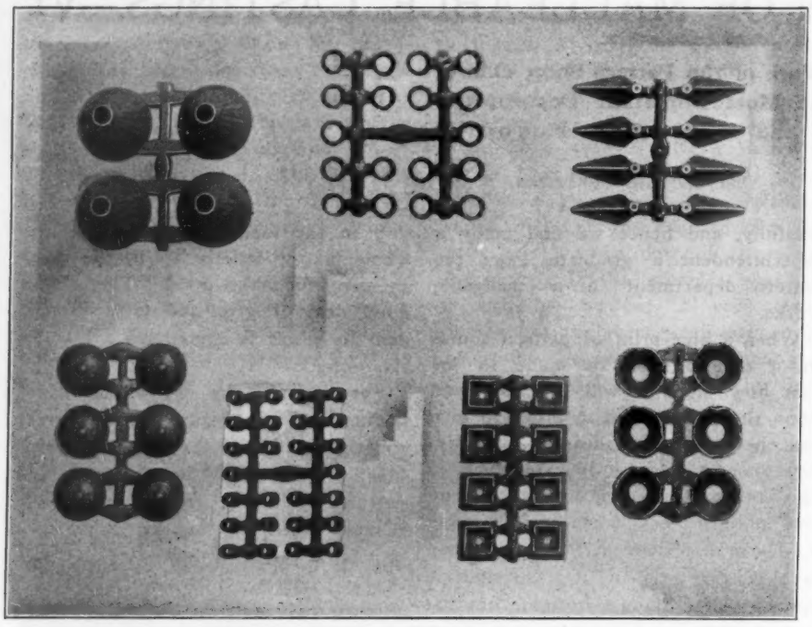


FIG. 2—METAL PATTERNS FOR CHANDELIER TRIMMINGS

called for, under guarantee of taking over up to a given number of these castings in case of change in pattern. This enables the founder to fill up a day for the molder, or to put the job on in case of a dearth of orders, storing the finished castings in the warehouse. The consumer, on the other hand, if requiring quick deliveries for some rush job finds his castings ready in part and is thus greatly accommodated.

It will be seen that this method of doing business necessitates a rather large pattern shop, and as practically all of the large works cater to railroads and other industrial enterprises which are continually improving their output, it oftentimes happens that some 35 patternmakers are required to keep 300 molders at work.

Specialty Pattern Work.

On the other hand, the makers of fittings, saddlery or other hardware, in which standard patterns can be kept, have gotten things so nicely balanced in their pattern systems, that they know to a dot just how many pieces can safely go on a card or plate; how the runners must be placed, their size, and how attached to the individual patterns. This work is now all metal, and the pattern store room of a modern large malleable works making a line of very small castings is very interesting and entails a heavy investment.

When developing a new article, say a journal box, rail joint, wagon skein, or what not, the patternmaker must practically live in the foundry. As the trial castings are made, he must measure them up with the pattern, make little changes here and there, try the matter out again, both before and after anneal, with iron from different parts of the heat, and thus bring out new points calculated to make the molding end easier, the difficulties from shrinkage less, and swing the job so that it can be carried on without difficulty. One therefore seldom finds the friction between molder and patternmaker in the malleable shop, so usual in the gray iron foundry, as the two departments are peculiarly inter-dependent. It should be the rule never to start an order for quantity on the floor until the pattern has been tried out, the hard castings broken up for evidences of shrinkage, the necessary corrections made, and every one interested satisfied that it is safe to go ahead.

Contraction and Shrinkage.

The above naturally results from the problem of the contraction of malleable cast iron. Contraction and shrinkage are two separate and well understood features in "malleable." Whereas shrinkage is erroneously applied to the shortening of a casting in cooling in the gray iron foundry, in the malleable, "shrinkage" is understood to mean the tearing apart of the particles of iron in the interior of a larger section, close to a small one, leaving a spongy mass, naturally weak, which is highly dangerous to the life of the casting. Contraction, on the other hand is simply the reduction in size incident to the cooling of a casting from the point of set to ordinary temperatures.

Now in the case of malleable this contraction in the hard casting is roughly ¼-inch to the foot, or double that of gray iron. In the anneal one-half of this is recovered, and hence the net result is the same as in ordinary foundry pattern practice. It will be seen, however, that this big contraction causes the tearing away

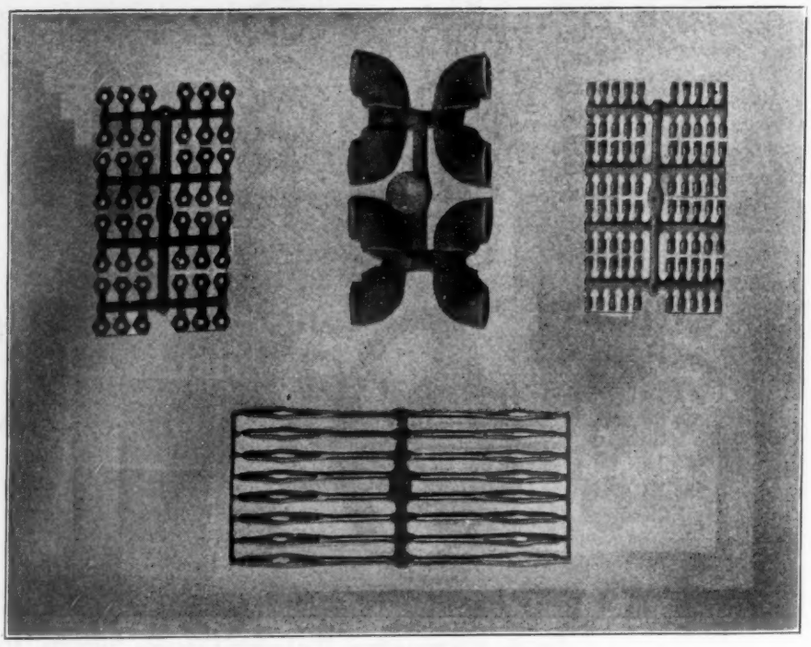


FIG. 3—MALLEABLE CASTINGS SHOWING METHODS OF GATING

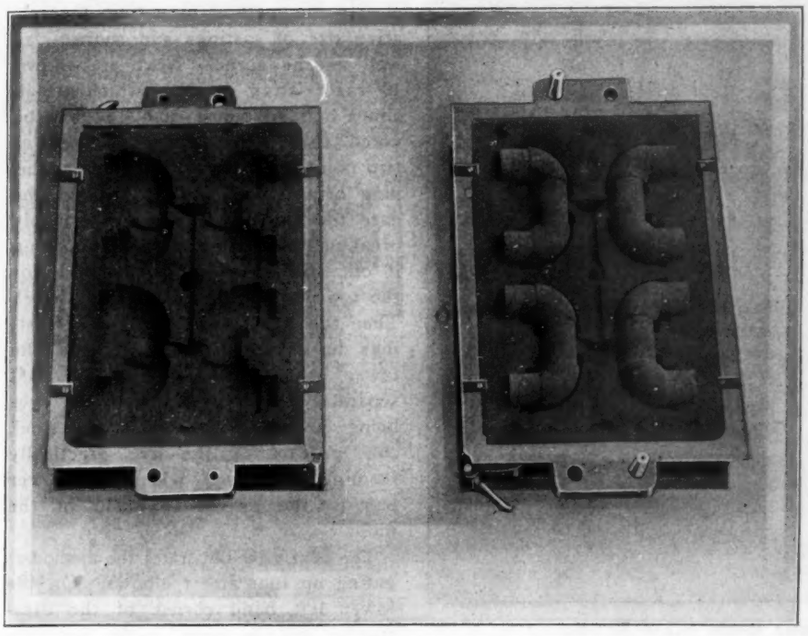


FIG. 4—MOLD CONTAINING EIGHT ¾-INCH STREET ELBOWS

of the iron particles above mentioned wherever a heavy part remains liquid just a little longer than the adjacent light part already set. The result must be a void, unless liquid iron can be fed in, or else the heavy portions chilled and made to set while the lighter parts can still pass liquid metal. Hence the use of chills, so prevalent in the malleable foundry. These mean expense, leave an uncomfortable feeling that the shrinkage was forced to some other part of the casting, are in every way undesirable, but remain a necessary evil. Feeders can also be used on occasion to advantage, but mean an increase in the already high percentage of wasters, and hence are resorted to only when necessary.

Use of Chills in Malleable Practice.

As a matter of fact, the chill is a very serviceable article, even if expensive. At one time a certain knuckle (by the way sold as steel), the section of which was three or four times as great as malleable could be successfully cast in the sand, was extensively used and gave very good results. Breaking it revealed the black heart of malleable. Observing the surface closely, quickly explained the reason for its quality. Chill upon chill could be traced by the contours left. Here was an example of what might be called a sandless casting at least in part. Probably it cost more than the steel casting, and hence finally disappeared. The chilling, however, accomplished a result that could not have been obtained in any other way, as it was necessary to have the casting practically white in the hard in order to anneal at all. About the ethics of selling this, as well as many other malleable articles, for steel, quite a chapter could be written.

Contraction.

The contraction of the iron used in malleable work has been mentioned as practically ¼-inch to the foot, with a return of ⅛-inch in anneal. Hence the shrink rule of the regular foundry pattern shop is used. Now this ¼-inch contraction will vary from 3/16 to 5/16-inch, and occasionally a little beyond even these limits. This is caused by many factors closely associated with the constitution of white iron. Thus, the lower the silicon and hence the harder the iron, the greater the contraction. Again the more sprues used, or the more steel used in the mixture, the silicon of the castings being the same, the greater the contraction. In the same heat, the first and last iron give different contractions, depending a good deal on whether the heat was "high" or "low" in the first place. Hence the importance of careful attention on the part of the pattern shop in following up work having to pass inspection, or where castings are sold by the piece, and any excess iron is a loss. The composition and method of melting the metal having its effect also on the anneal, the castings may not recover the ⅛-inch, and again repeated annealing opens up the structure to an extent quite appreciable in measuring up the finished casting. Thus the whole question is beset with difficulties, every case requiring individual treatment.

Use of Steel Scrap.

With rather thin castings the expansion after anneal may be so great that occasionally the whole of the contraction is taken up, and the casting is as large as the pattern. This more particularly with the higher ranges of silicon in the iron. Hence, as previously stated, particular attention should be given each case.

Nor is the subject closed here. Of late there has developed a tendency to

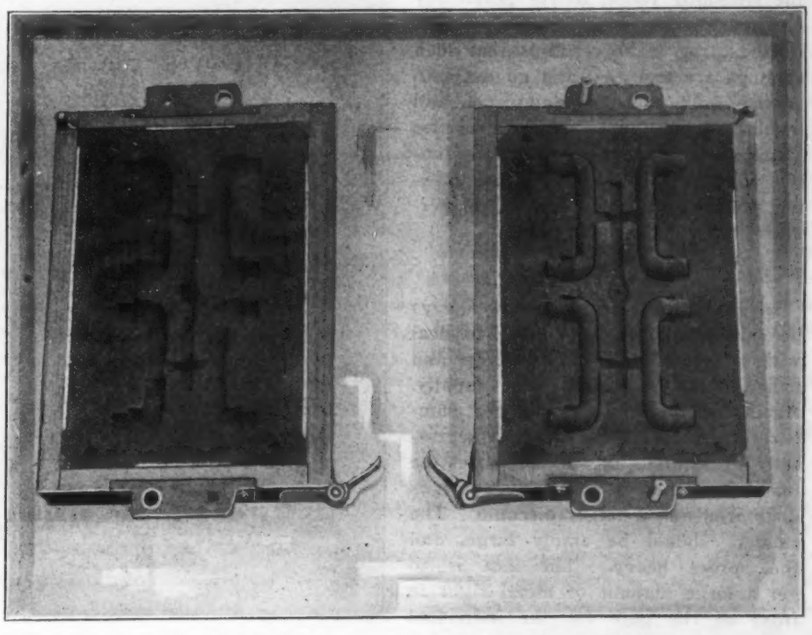


FIG. 5—MOLD CONTAINING EIGHT SMALL STREET ELBOWS

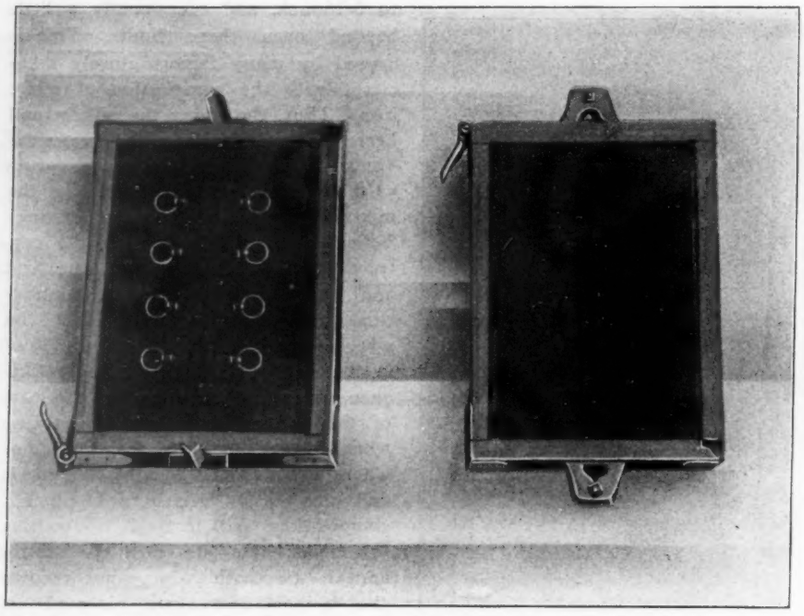


FIG. 6—MOLD CONTAINING EIGHT RAZOR STRAP SWIVELS

add large quantities of steel scrap to malleable mixtures. This is copied from the steel additions in gray iron, where occasionally as high as 40 per cent goes into the cupola. In the case of small castings, the bad effect of too much steel is perhaps not so noticeable as in the long or complicated ones, but not only will there be annealing troubles where more than 10 per cent of steel scrap is used in a malleable mixture, but there will occur serious cracking on the part of castings in the hard, especially where strains are likely to be set up. These cracks are not always discovered in the trimming room, unless practically each casting is struck to see whether it rings true. The result is that such castings are annealed and go out into service only to cause annoyance and trouble. Thus will result difficulties from experimenting beyond safe limits, whether this be in mixture making, melting, or in annealing temperatures.

Gating Patterns.

In gating patterns it should always be remembered that we have to deal with a metal which chills easily, and hence must be poured very rapidly. Again for the same reason the number of pieces that can be run successfully is limited, unless the gates be made too thick, which in turn means dirty iron and a larger discount. The runners should be amply large, and the sprues heavy. The idea is to get a large amount of metal right in front of the gate for the individual casting. The rest will then be up to the molder to pour properly and the melter to give iron that can be satisfactorily poured.

The methods used for producing small castings in the malleable foundry are not different from the gray iron works, except in the gating as above mentioned, and hence no space need be given to the matter further than to show a number of illustrations which tell the story sufficiently plain.

Fig. 1 shows 10 clevis castings made in one mold (reading from left to right). This batch of castings has just been shaken out and shows very clearly the method of gating, the relative size of castings and runners, as well as the sprue. Next are shown 10 razor strap handles which weigh about half an ounce each. It will be noted that each handle is gated at two points in order to insure free running of the iron without making the gate too thick, and thereby probably breaking the casting itself in knocking it off. Next are shown 16 eyes for the top part of the razor strap swivel. Then the completed swivel, eight castings in a mold. The eyes and the lower part of the swivels are cast separately, the swivel part of the eyes being covered with shellac and sand, this portion of the eye practically forming the core when the lower part of the swivel is made in the mold.

The next view illustrates the method of gating up four street elbows. On the lower left hand corner of the illustration will be seen eight bushings weighing about eight ounces each gated up properly. Next a die stock weighing about nine pounds. This is gated as shown and allows the metal to flow very freely. A friction drive gear casting is shown next, the sprue being unusually small. The casting weighs about 50 pounds. The other two castings are used in connection with the die stock, and are also malleable.

Chandelier Patterns.

Fig. 2 shows a lot of chandelier metal patterns, with the method of gating and location of the sprue shown

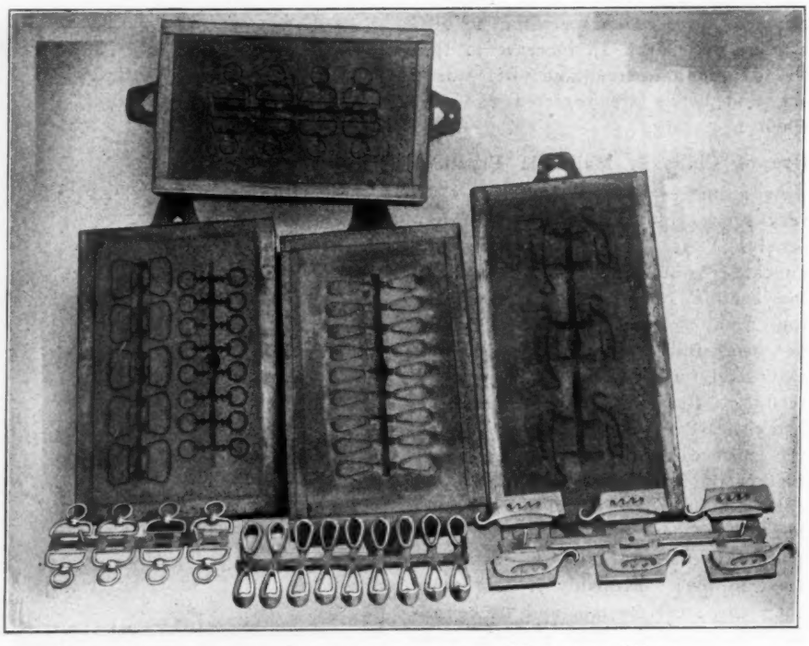


FIG. 7—MATCH PLATES—USED EXTENSIVELY IN MALLEABLE WORK

very plainly. Reading from left to right we have first chandelier patterns, then another pattern, then patterns of fence pickets, again chandelier parts, all carded, and 26 carded patterns for one mold, in the lower left hand corner.

Fig. 3 shows carded patterns for 48 lock nuts, each weighing about an ounce apiece; 16 patterns of a saw handle clip, each casting weighing about three ounces. The third carded pattern set is for 81 ⅛-inch pipe plugs, which weigh less than ½-ounce each. In the center are shown eight 1½-inch elbows just cast and not yet knocked off the gates.

Fig. 4 shows a mold for ¾-inch street elbows, made on a machine, a pattern plate having been used. It shows the method of gating nicely.

Fig. 5 is a similar mold, containing eight 1½-inch elbows.

Fig. 6 shows a mold for making razor strap swivels, the eye of the swivel being shown in the mold. As previously stated, the shank is coated with shellac and sand. After annealing and tumbling, the eye can easily be rotated, but not so in the hard.

Match Plates.

The match plate is a very important factor in the malleable shop, great care being exercised in getting it right where much work is to be done. The subject is of course familiar to every foundryman, and hence only one view is shown herewith in Fig. 7.

Here we have a varied lot of match plates. At the top is shown one for molding razor strap swivels. Below at the left is shown a match plate for the eyes of the razor strap swivels and the handles. Next to this is the match plate for another small section. Lastly the match plate for a saddlery hardware casting of a more difficult nature.

The matches themselves are made of sand hardened with litharge. Matches can, of course, be made of many products. Thus common clay will do all right for a small job and will last for some time successfully. Plaster matches are more generally used, especially if hardened with cement to insure better wear.

The subject of mounting patterns is a very important one, and numerous methods have been brought out to facilitate this work. Practically every maker of molding machines now develops a method peculiarly adapted to his uses and much ingenuity is displayed. Attention is called to the paper on the subject written by S. H. Stupakoff, for the American Foundrymen's Association, and presented at the Milwaukee convention, in which he describes a universal method of mounting patterns using a jig plate accurately bored and allowing of a quick placing of a number of patterns with great accuracy.

Another method, used for the Berkshire molding machine, and described in the November issue of *The Foundry* is very interesting, that part in which half of the plates are recessed on one side for making green sand cores should be studied, as it simplifies many a problem in making castings on machines.

THE RELATION OF DENSITY, POROSITY AND MOISTURE TO THE SPECIFIC VOLUME OF ORES.[1]

By Warren J. Mead.

It is often necessary to know the cubic content of a material as it lies in the ground, in order to estimate the amount in place, or tonnage represented by a given excavation, or to compare different grades of ore. This cubic content is a direct function of: (*a*) True specific gravity of the material, that is, the specific gravity unaffected by porosity or moisture; (*b*) porosity of the material, in terms of per cent of volume occupied by pore-space or voids; (*c*) percentage of moisture in the material, that is, the percentage loss in weight on drying at 110° Cent.

To facilitate the determination of the cubic content of ores the accompanying diagram or graphic equation was devised expressing the relation between these three factors and the number of cubic feet per ton. Actual determinations in the ground are unsatisfactory in that they do not show the individual effects of the three factors mentioned, especially moisture content which may vary widely at different times and places. By use of the diagram the three factors are considered separately, and their individual, relative, and net effects may be observed. The method was devised for the determination of cubic contents of Lake Superior iron ores, and results have been checked with a considerable number of empirical determinations by the mining companies. The table is equally applicable to any ore or other mineral substance in the ground.

Use of the Diagram.

The operation of the diagram may perhaps be made clear most easily by applying a concrete problem by way of illustration. Given an ore with a specific gravity of 4.5, porosity 30 per cent, and moisture 10 per cent. Select a point on the upper edge of the diagram indicating the given specific gravity (4.5), from there move downward, as indicated by the dotted line, to the line representing the given porosity. (There are two sets of inclined lines crossing the upper part of the diagram; the less steeply inclined set, numbered at the left side of the diagram, indicates degree of porosity.) From this point move upward to the right along the more steeply inclined lines to the edge of the diagram. This point (3.15) indicates the specific gravity as corrected for porosity. From this point move directly downward to the lower edge of the diagram where the number of cubic feet per ton is indicated. This shows 11.4 cubic feet per ton of dry material. The factor of moisture has not yet been considered. When moisture is present the material is heavier and consequently the volume per ton is smaller. To introduce this factor of moisture, move directly upward from the last point (11.4) to the horizontal line indicating the given percentage of moisture (10) and from this point down the inclined line to the lower edge of the diagram where the number of cubic feet per long ton is found to be 10.2.

At the lower edge of the plate is a transformation table showing the relation between cubic feet per long ton (2,240 pounds) and cubic feet per short ton (2,000 pounds). For example: 10.2 cubic feet per long ton is equivalent to 9.1 cubic feet per short ton.

The following methods of determining the above constants were found to apply very well to the Lake Superior iron ores, and may apply to other ores.

Specific Gravity.

To avoid confusion it may be well to define the terms mineral specific gravity, and rock specific gravity as used in the present discussion. As the term implies, by mineral specific gravity of an ore is meant the specific gravity unaffected by

[1]Published by permission of the director of the United States geological survey. Work done in connection with forthcoming final monograph on the Lake Superior region, now in preparation by C. R. Van Hise and C. K. Leith.

porosity or moisture, determined entirely by the mineralogical composition. The term rock specific gravity applies to the entire mass of the material, and differs from the mineral specific gravity in proportion to the porosity of the material, and the moisture present. In making determinations of mineral specific gravity it is, of course, necessary to exclude all effects of pore-space and moisture. When the material is of a known mineralogical composition the specific gravity may be readily calculated from a chemical analysis of the material. This method is very satisfactory and does not necessitate any gravimetric determinations other than an occasional one as a check on the calculated figures.

When the nature of the material admits, determinations may be made on hand specimens by the common method of weighing first in air and then submerged in water. In this method care is needed to insure complete drying before weighing in air, and complete saturation before weighing under water. The former may be accomplished by prolonged drying in an air-bath at 110 degrees centigrade, and the latter by prolonged boiling in water under reduced pressure. The more porous the specimen, the more easily are both of the above operations accomplished. A third method, which has some points of advantage over the other two, is determination of the finely powdered and dried material by means of a specific gravity bottle.

Porosity.

Porosity is expressed in terms of per cent of volume occupied by pore-space or voids. Determinations of porosity in hand specimens may be made by finding the weight of water absorbed in saturating a completely dry specimen. This measures the amount of water needed to fill the openings, which amount may be calculated in terms of volume by taking account of the specific gravity of the material. Given, mineral specific gravity, and moisture of saturation in terms of percentage weight, porosity may be calculated as follows:

$$P = \frac{M}{\frac{1-M}{G} + M}$$

P = porosity,
M = moisture of saturation,
G = mineral specific gravity.

In unconsolidated material such as a large part of the iron ore of the Mesabi district, porosity cannot be readily determined from hand specimens, and it is necessary to resort to actual measurement of the volume of an excavation caused by the removal of a known weight of ore. From this determination of volume, together with a moisture and mineral, specific gravity determinations, porosity may be calculated, and the diagram becomes useful in showing the effects of fluctuation in moisture in an ore of uniform composition and texture.

In the iron ores of the Mesabi range or in any material, the unconsolidated nature of which does not permit the removal of hand specimens, porosity determinations may be very readily made by completely saturating a portion of the material in place by an abundant application of water. A sample of the saturated material placed immediately in a sealed vessel enables the detrmination of the moisture of saturation, which measures the porosity.

Where the ore to be tested is in a vertical wall, a small niche should be cut to afford a horizontal surface for the application of the water. It will be seen that this method does not differ essentially from the determination of porosity of hand-specimens, except that the material is saturated in place and not after removal from the ground.

Moisture is considered in terms of percentage of total weight. It is determined by noting the percentage loss in weight on drying at 110 degrees Cent.

Construction of the Diagram.

The following discussion of the derivation of the diagram is given with the idea that one desiring to make use of it would first wish to be assured that it rests on a rational mathematical basis.

The top and bottom lines of the diagram proper, labeled respectively, "specific gravity," and "cubic feet per ton" and connected by parallel vertical lines, constitute a transformation table by means of which the number of cubic feet per ton of a material of a given density may be at once determined (or *vice versa*) by moving vertically between the upper and lower edges of the diagram. Immediately below the edge of the diagram proper is a scale of pounds per cubic foot, which may be used by moving vertically downward from any point on the "specific gravity" or "cubic feet per ton" scales.

Effect of Porosity.

The effect of porosity is to decrease the density of a substance, hence rock specific gravity is less than mineral specific gravity in proportion to the degree of porosity of the material considered. To introduce the factor of porosity in the diagram, the upper line was extended to the right to the point indicating a specific gravity of zero (not shown on the diagram). The line at the left edge of the diagram was drawn perpendicular to the upper edge and divided into 100 equal divisions, representing percentages of pore-space. Each of the points of the vertical "porosity" line was then connected with the point indicating a specific gravity of zero. Hence on moving vertically downward from any point on the "specific gravity" line, a succession of equally spaced lines are crossed indicating percentages of pore-space. To enable the diagram to automatically show the change in specific gravity resulting from a given porosity of a substance of known mineral specific gravity, a set of parallel lines was drawn, properly connecting points on the "porosity" and "specific gravity" lines. These lines were drawn parallel to the line connecting 100 per cent porosity with zero specific gravity, and agree with the formula:

$$Gr = Gm\ (1-P)$$

where Gr = rock specific gravity, Gm = mineral specific gravity, P = porosity. The diagram then automatically shows the relation between mineral specific gravity, porosity and cubic feet per ton. To illustrate, a certain ore with a mineral specific gravity of 5.0 has 40 per cent pore-space. Beginning at the point 5.0 on the upper edge of the diagram, move downward to the line indicating a porosity of 40 per cent, from this point move along the parallel inclined lines upward to the right, to the edge of the diagram, where the specific gravity as reduced by pore-space (rock specific gravity) is found to be 3.0; immediately below this point, on the lower edge of the diagram it is seen that the ore runs 11.95 cubic feet per ton, and 187.25 pounds per cubic foot.

Effect of Moisture.

The diagram so far takes no account of moisture, and hence is applicable only to perfectly dry material. Moisture when present in an ore or similar substance occupies the pore-space. When the pore-space is filled with moisture the material is said to be saturated. As the moisture occupies the natural openings in the ore, its presence affects the weight of the ore and not its volume, hence its effect is to increase the density and decrease the number of cubic feet per ton. Moisture is expressed in percentage of total weight.

Let D = density as affected by porosity.

$$\text{Cubic feet per ton} = \frac{2{,}240}{D \times 62.4}$$

(one cubic foot of water weighs 62.4 pounds).

When moisture (M) is present the above equation becomes,

$$\text{Cu. ft. per ton} = \frac{2{,}240}{(D \times 62.4)\ (M+1)}$$

The lower part of the diagram is crossed by a set of parallel horizontal lines indicating percentages of moisture, as shown at the right-hand edge of the diagram. Following the above equation, a set of inclined lines were drawn, properly connecting points on the "moisture" and

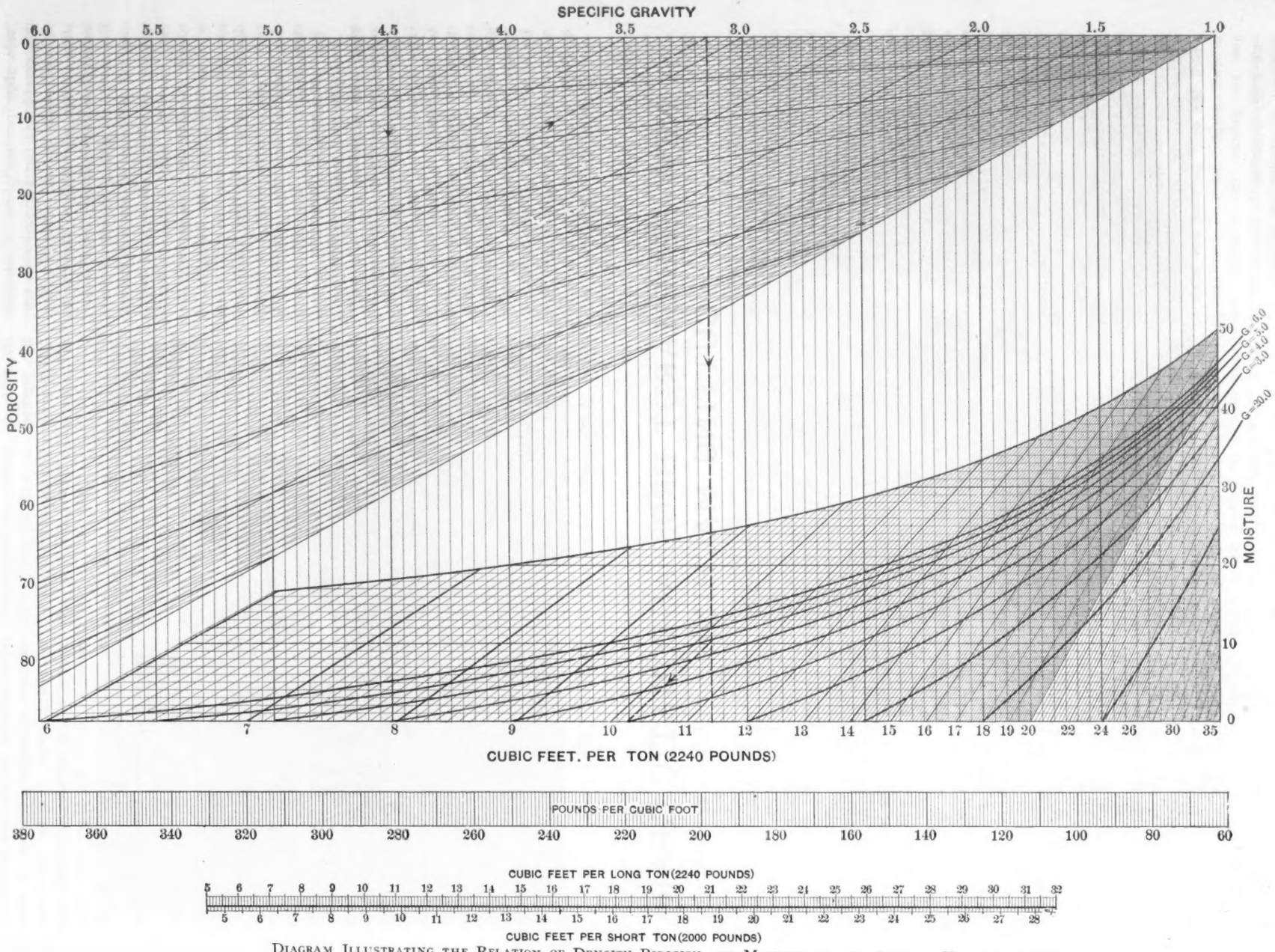


DIAGRAM ILLUSTRATING THE RELATION OF DENSITY, POROSITY AND MOISTURE TO THE SPECIFIC VOLUME OF ORES.

"cubic feet per ton" lines. Given the number of cubic feet occupied by a ton of any porous material when *dry*, the effect of any percentage of moisture is indicated automatically by the diagram. For example, a certain ore when dry occupies 12 cubic feet per ton, it is desired to know the effect of 10 per cent moisture. From the point 12 on the lower edge of the diagram move vertically upward to the horizontal line indicating 10 per cent moisture; from this point move downward along the inclined line to the edge of the diagram, where it is found that the moist material occupies 10.8 cubic feet per ton.

Moisture of Saturation.

Up to this point it has been shown that, given mineral specific gravity, porosity and moisture content of an ore or similar substance, the diagram automatically indicates the number of cubic feet per ton. In many classes of ore the factor of moisture is the most variable of the three named above. Mineral specific gravity, and porosity of an ore determine the amount of moisture which it is possible for an ore to hold. This maximum, or moisture of saturation may be calculated as follows:

Gm = mineral specific gravity.
D = density of dry porous material.
P = porosity.
M = moisture of saturation.
$D = Gm\ (1 - P)$.

from which $P = 1 - \frac{D}{Gm}$

$$M = \frac{P}{Gm\ (1 - P) + P}$$

substituting above value for P,

$$M = \frac{1 - \frac{D}{Gm}}{D + 1 - \frac{D}{Gm}}$$

By substituting values for D and Gm in the above equation the moisture of saturation curves were constructed across the lower part of the diagram. These curves enable one to determine at once the moisture of saturation of any material given the mineral specific gravity and porosity. Each curve corresponds to a certain mineral specific gravity, and the moisture of saturation is found by moving vertically from the point indicating the number of cubic feet per ton of the dry material to the proper moisture of saturation curve. For example, an ore with a mineral specific gravity of 4.0 porosity 36.0 per cent, occupies 14 cubic feet per ton if dry—its moisture of saturation is found by moving upward from the point 14, to the curve $G = 4.0$, and reading the indicated moisture,—in this case 12 per cent. That is, 12.3 per cent moisture would fill the pore-space of the material in question.

Excess of Moisture Handled in Mining.

It frequently happens in mining that ore as hoisted to the surface actually contains a larger percentage of moisture than it did before it was mined, it may in fact contain a percentage of moisture greater than the moisture of saturation of the unmined ore. This may be caused by the handling of broken ore on undrained mine floors. The ore after being broken down, has a much larger percentage of voids than before, and hence a greater ability to absorb and retain moisture. The diagram is useful in this connection in showing, from determinations of specific gravity and original porosity of hand specimens, the moisture of saturation of the ore in place. This figure compared with the percentage of moisture of ore as it leaves the mine tells at once whether or not an unnecessary amount of water is being hoisted with the ore, due to improper drainage.

A NEW EBERHARDT BROS. AUTOMATIC GEAR CUTTING MACHINE.

The accompanying illustrations show an automatic gear cutting machine of new design, brought out by Eberhardt Bros. Machine Co., of Newark, N. J. The machine is designed to accommodate a large range of work, including spur, bevel, skew and face gears, all of which can be cut entirely automtically. It has been placed on the market to fill the requirements of those needing a heavy machine to rough out bevel gears preparatory to finishing on a bevel gear planer, as well as to afford the jobbing and repair shops a machine for finishing bevel gears by the milling method, and yet without limiting the capacity of the machine for spur gear work. The design therefore is not an adaptation of the present type of machines as built by this company which cut spur gears only, but it is a distinctly separate product, in which the only purpose has been to produce a rigid form of construction and yet provide the necessary conveniences of operation and insure the accuracy of production which a machine of this type should embody.

The machine has a capacity of 48 inches diameter and 10 inches face, and will cut 3 diametral pitch in steel and 2½ diametral pitch in cast iron. Heavier pitches can be cut by taking stocking out cuts; for example, one of the first lot of these machines is cutting 2 diametral pitch in steel as regular work. The machine uses a rotary milling cutter, although the general appearance of the machine itself is similar to that of the now accepted types of bevel gear planers.

The method employed in cutting the large variety of gears above named, is shown by Fig. 1. This shows a cast iron wheel in place on the work arbor, the teeth, which include spur teeth, right and left hand "skew" teeth, and face gear teeth. These were all cut automatically. The "gashed" worm wheel teeth were cut by feeding the blank into the cutter by hand. It may be explained here, that "skew" teeth are used in many cases instead of hobbed worm wheel teeth, for meshing with a worm. The miter gears shown on the floor were cut entirely automatic, one having been roughed out only with one central cut, and the other being finished in two side cuts.

As may be seen, the work head is adjustable in two directions. One is the adjustment which accommodates the different diameters of blanks, and sets the depth to be cut in the gear blank, while the other is at right angles to the first, and is used so as to accommodate bevel gears and pinions with various lengths of hub. This also is used to set the depth when cutting face gears. Adjustable dials are provided on both screws, graduated to read to 0.001 inch. The long screw which adjusts the head for different diameters of blanks, has a square on both ends for convenience in setting, so that it may be operated at either end.

The angular adjustment required for cutting bevel gears, is made by means of the stanchion which supports the cutter carriage. This stanchion, clearly shown in Fig. 2, is adjustable through an angle of 90 degrees, in a horizontal plane, and is pivoted about the center of the machine. The stanchion is secured to the bed by means of bolts in the circular T slots.

For making the angular adjustment, a worm is provided, engaging the circular rack which is secured to the bed. The worm carries a dial graduated to read to minutes of a degree, each whole degree being a whole turn of the crank.

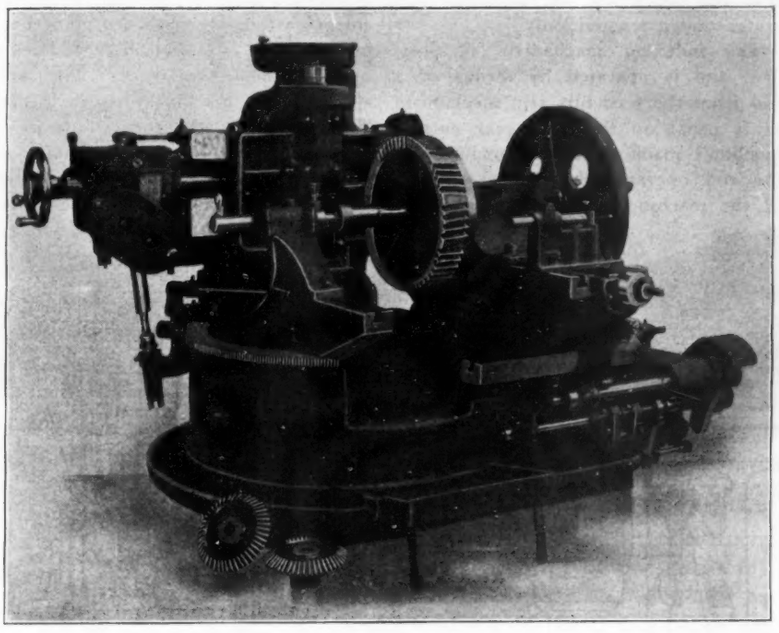


FIG. 1—FRONT VIEW OF EBERHARDT BROS. NEW AUTOMATIC GEAR CUTTER.

The illustration plainly shows that the stanchion is equally rigid at every angle, whether set for spur gears, bevel gears, or even when adjusted through the entire 90 degrees for face gears. It was this factor of uniform stiffness that decided in favor of this type of construction, especially for a heavy duty machine, in preference to the usual type of machine in which the cutter carriage is elevated for bevel gears.

The line drawing, Fig. 3, explains the "swivel slide," which is adjustable in a vertical plane, being pivoted about the trunnion which is shown. This slide is operated by means of the vertical screw, and graduations indicate the angle at which the "swivel slide" is set. The slide is securely bolted to the stanchion, and when loosened while making the adjustment, is automatically held from sagging away from the joint. By swiveling this slide, the cutter-carriage, which is mounted upon it, is thus made to travel in a path at an angle with the axis of the work spindle. This adjustment is used for cutting right and left hand skew gears, and for taking side cuts on bevel gears, thereby obviating the necessity for "rolling" the blank. The rolling method of cutting bevel gears, may be used, however, as there may be work on which this method is desired, and the indexing worm is therefore graduated, to facilitate this adjustment. The "swivel slide" is also used to set the cutter at the angle of the worm thread, when gashing worm-wheels.

The rotary cutter is mounted upon the vertical cutter arbor, the spindle bearing being adjustable vertically, to set the cutter central. A dial is provided to be used to indicate the offset of the cutter, when taking side cuts on bevel gears. The lower end of the cutter arbor is supported by an outboard bearing. An outside support is also furnished for the work-arbor, as shown in Fig. 1. This accommodates wheels up to the full diameter of the machine. The support is easily removed. Rim rests are provided to support the rim of large gears against the thrust of the cutter. A face-plate is also furnished, with jacks and drivers to positively secure and drive large wheels. The cutter spindle and work spindle have taper holes, and each is provided with a draw-in bolt, to draw in and force out the arbors positively.

The drive may be traced from Fig. 3, which plainly shows the single pulley running at constant speed, supplying the power for the entire machine. The driving pulley runs on the cast iron sleeve which is bolted to the bed, thus relieving the shaft of the pull of the belt. The driving shaft then drives through the miter gears shown in the center of the machine, this being the pivotal point about which the stanchion is adjusted when setting the cutting angle for bevel gears.

The cross-over shaft then drives through spur gears, and across to the center of the "swivel slide" to a pair of miter gears. The driven miter gear is secured on the shaft which operates the cutter driving train on one end, and the cutter-carriage feed and return mechanism on the other end.

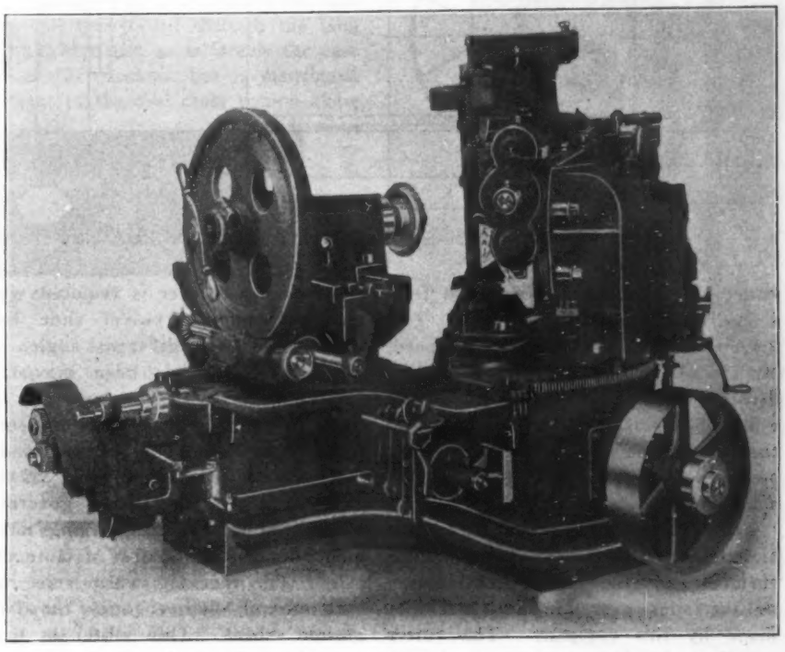


FIG. 2—REAR VIEW OF EBERHARDT BROS. NEW AUTOMATIC GEAR CUTTER.

The cutter drive is obtained by means of spur gears of powerful ratio, operated by change gears for obtaining the different rates of cutter speed, these being arranged in geometrical progression. The feed of the cutter carriage is changed by gears in similar manner, but the return of the carriage is at a constant high rate of travel, which is independent of the speed or feed of the cutter. The cutter speeds and feeds are also independent of each other.

It will be noticed that there is an entire absence of ball joints and telescopic shafts in the drive train. The driving shafts run at constant speed, all changes being made at the last drivers. This is a great factor in reducing vibration under heavy duty, there being no shaft under excessive strain, whether the cutter is running at a high or a low speed.

The cutter carriage is of exceptional length, and travels on long guiding surfaces, of the same construction as the spur gear cutting machines made by this company. The cutter spindle is in the center of the length of the carriage; this prevents the usual lifting or "gouging" tendency of the cutter, when starting in each tooth.

The thrust bearings for the feed screw are placed at each end, so that the screw is under no compression strain during either the feed or the return of the cutter carriage; this "draw cut" principle reduces vibration and chattering, as the screw operates under tension only.

The indexing mechanism is positive, and is operated by means of a rod from the feed box trip mechanism as is usual on the spur gear cutting machines made by this company. As the rod operates through the center of the machine, no adjustment or readjustment whatever is required when the stanchion or swivel slide have been moved for different angles, or when the head has been moved in either direction. The use of all chains is eliminated. There are only the two usual dogs to be set to suit the various lengths of face of the gear blanks, the mechanism governing the operation of the indexing movement being taken care of automatically. The indexing worm runs in a bath of oil, and engages the large master wheel. This wheel is made in halves, to insure accuracy.

Among the minor conveniences may be mentioned the hinged covers for the change gears, as well as the guards encasing all gearing. Oiling facilities have been carefully studied out and provided. The bearings of shafts and spindles which operate in a vertical position have spiral oil grooves cut of the opposite hand to which the shaft runs, to retard the downward flow of the oil. Felt wipers are arranged on all the plane bearing surfaces, to keep dirt and chips out, and hold the oil in. The work spindle is a machinery steel forging. The cutter spindle and arbor are of tool steel, and all driving shafts are of high carbon machinery steel. Shafts and spindles are accurately ground. An oil pump driven by spur gears, supplies the cutting lubricant to be used when cutting steel, the lubricant being returned to the suction pipe by means of the oil pan.

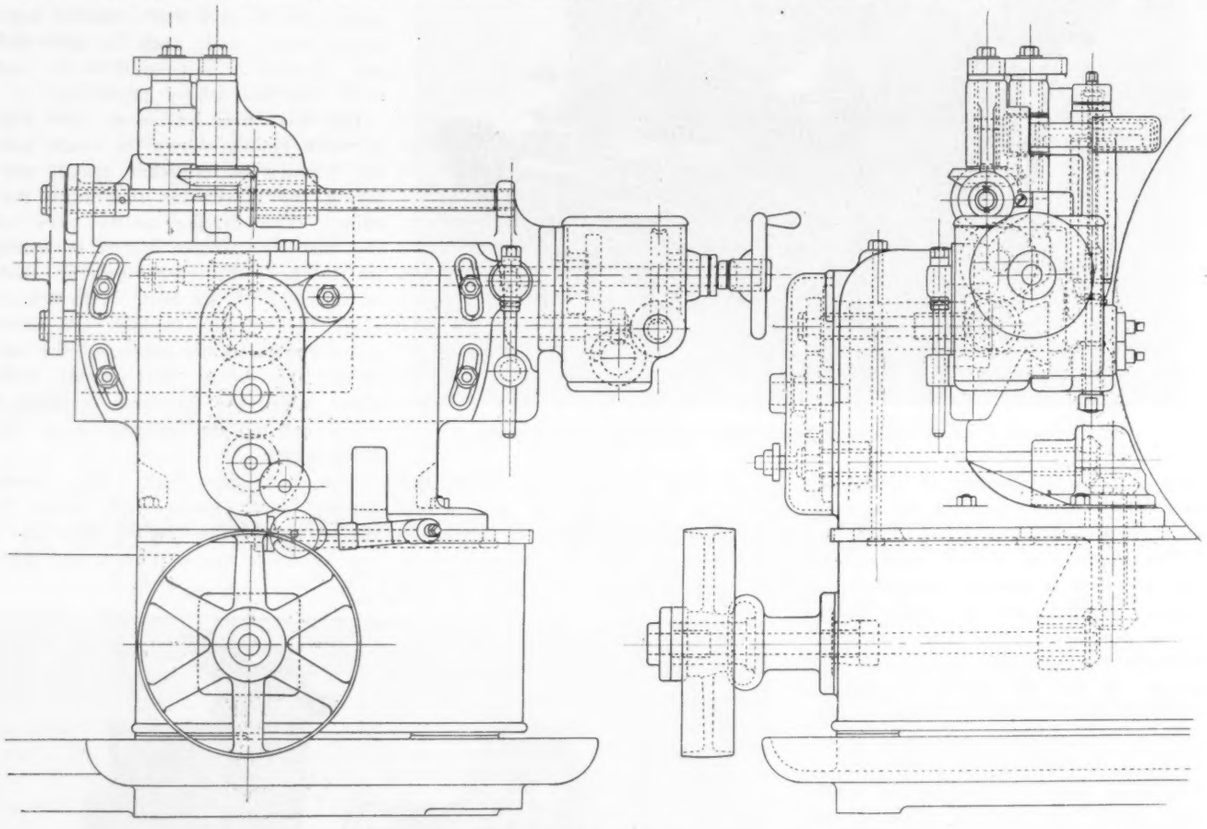


FIG. 3—SWIVEL SLIDE FOR EBERHARDT BROS. NEW AUTOMATIC GEAR CUTTER.

A MILLING MACHINE JOB ON MOTOR FRAMES.

The accompanying photographs illustrate an interesting example of the peculiar adaptability of milling machines to certain kinds of work and the increasing field in which this type of machine suggests the most economical method of machining. Fig. 1 shows two electric motor frames set

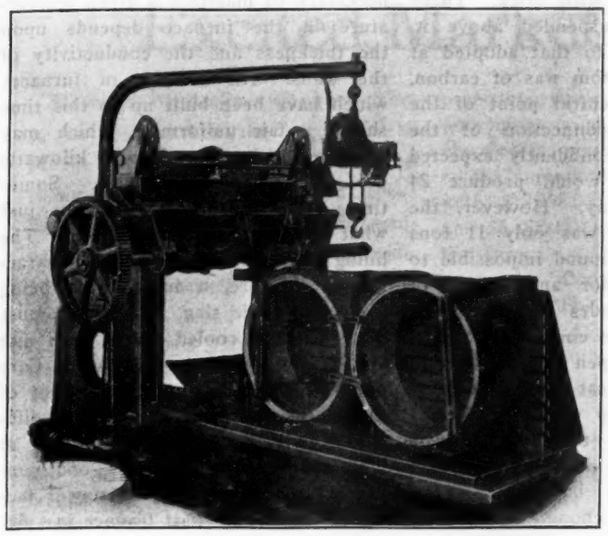


FIG. 1—MACHINING MOTOR FRAMES ON INGERSOLL MILLING MACHINE CO.'S STANDARD TOOL.

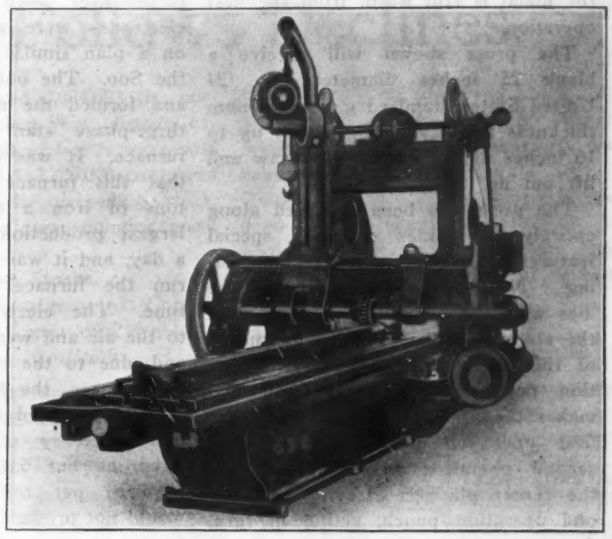


FIG. 2—MACHINING FLOOR RAILS ON WHICH MOTOR FRAMES ARE SET.

up for machining, the general character of the milling tool, location of the cutter bar and the kind of milling cutters used. This job represents the routine method used by a large electrical manufacturing concern in finishing these motor frames to fit floor rails. The frames are about 42 inches in diameter and the machine is one of the Ingersoll Milling Machine Co., Rockford, Ill., 60 x 48-inch by 12-foot standard horizontal spindle machines.

The frames have a groove cut in the bottom to keep them in line and must fit with considerable accuracy the corresponding tongue on the rail. To plane both motor frame and rail so that there would be no fitting necessary and have all of the frames interchangeable would be a rather difficult task. The motor frames are first bored and faced by special machines, then taken to the milling machines and set up as shown, which setting is equally applicable to frames of smaller size. The angle plate shown here for setting up the frames is the special equipment of the Bullock Electric Mfg. Co., but other devices of similar character are used in other shops which contribute none the less to the economy and satisfaction of this method of machining. Fig. 2 shows the job of milling the rails, which is a very simple matter.

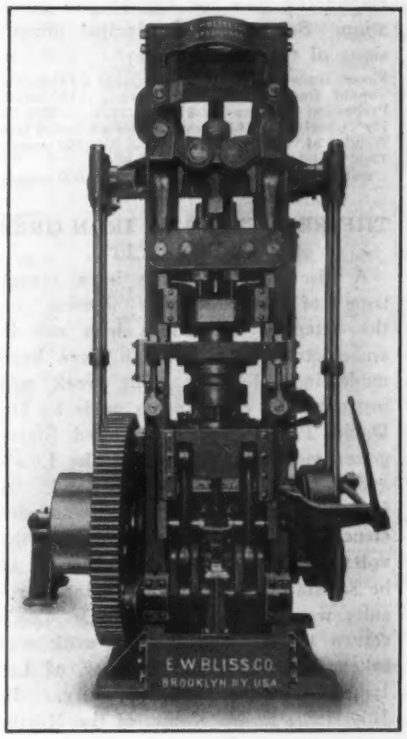
POSITIVE OVAL DRIVE DRILL SOCKETS.

The Lancaster Machine & Knife Works, Lancaster, N. Y., has placed on the market a full line of drill sockets and sleeves furnished with positive oval drive. The distinguishing feature of these sockets, one of which is illustrated herewith, is that the bore instead of being cylindrical, as in the usual socket, is oval in shape. The drill shanks are turned oval to fit these sockets. Thus, it is seen that the force required to drive the drill is not all transmitted through the tang on the drill shank, as is largely the case with circular sockets, but is distributed by virtue of the oval cross section along the entire length of the socket. The sockets are tapered ⅜ of an inch to the foot and the company is prepared to furnish twist drills of standard makes with shanks turned to accurately fit the oval sockets.

OVAL DRIVE DRILL SOCKET.

A NEW BLISS TRIPLE ACTION DRAWING PRESS.

A new triple action drawing press has been placed on the market by the E. W. Bliss Co., 8 Adams street, Brooklyn, N. Y. It is the development of the "Bliss" patent toggle drawing press which is used for drawing all kinds of sheet metal goods. This type is presented as being especially useful and economical for drawing deep seamless shells. Fig. 1 illustrates the general appearance of the press. It will be seen that in addition to the plunger there are two slides, making in one operation work which has hitherto required two. This method does away entirely with handling or annealing the first operation shells, inasmuch as the second operation immediately follows the first, and the second draw is made while



NEW BLISS TRIPLE-ACTION DRAWING PRESS.

the metal is still warm from the first operation.

The press shown will receive a blank 25 inches diameter, No. 24 United States standard gage maximum thickness and a drawing punch up to 16 inches diameter. It will draw and lift out up to 9½ inches.

The press has been designed along entirely new lines and the special features embodied in it are interesting. The lower table carrying the dies with the blank is raised to meet the stationary blank holder by means of the toggles, then the first operation punch comes into action and makes the first draw, after which the first operation punch becomes the second operation blank holder, and the center plunger, carrying the second operation punch, acting in turn, draws the blank through the second operation die, after which the lower table carrying the dies recedes. This latter action, in conjunction with the lower positive knockout, places the drawn shell free on top of the die ready for removal.

The press is compact in construction and occupies no more room than any double action press of the corresponding size for the second operation. Some of the principal dimensions of the machine are:

Floor space over all	111 x 131 inches
Top of frame to the floor	189 inches
Proportion of gearing	21½ : 1
Fly wheel	54 inches diameter x 8 inches face
Weight of fly wheel	2,300 pounds
Total weight of machine, approximately	60,000 pounds

THE REDUCTION OF IRON ORES BY ELECTRICITY.

A discussion is given in a recent issue of the *Electrical Review* on the attempts to reduce iron ore in an electric furnace which have been made in California. The work was instigated by experiments made by Dr. David T. Day for the United States government at the time of the Lewis and Clark exposition, Portland. A furnace of the Heroult type was constructed, controlled by varying the voltage. This control was found to be satisfactory, but no quantitative results were obtained. After Dr. Day's return to Washington, the work was taken up by G. H. Clevenger, of Leland Stanford Jr. University. In July, 1907, H. H. Noble, of the Northern California Power Co., looking for a market for some of the power developed by his company, retained Dr. Heroult to design and build a furnace for smelting iron ore of the Shasta Iron Co. A 1,500-kilowatt, three-phase furnace was built and put into operation. It consisted of a steel shell 13 feet long and 5 feet 6 inches wide, lined with brick. Three electrodes were suspended above it, on a plan similar to that adopted at the Soo. The bottom was of carbon, and formed the neutral point of the three-phase star connection of the furnace. It was confidently expected that this furnace would produce 24 tons of iron a day. However, the largest production was only 11 tons a day, and it was found impossible to run the furnace for any length of time. The electrodes were exposed to the air and were consumed rapidly, and, due to the open construction of the furnace, the heat was unbearable and men refused to work. The thermal efficiency of the furnace was good, as but 0.26 kilowatt-year was required per ton; but the furnace would not produce enough iron at that figure to make it pay, one reason being the low power-factor, which is 73 per cent, and another the inability to keep full power on the furnace all the time. In January of this year, Mr. Clevenger, co-operating with Prof. D. A. Lyon, constructed a 160-kilowatt, single-phase furnace. The stack is of concrete, 29 feet high. The electrodes are fixed in the walls of the crucible, and a variable-voltage transformer is used to keep full power on the furnace at all times. The charging is done from the top, so that the long column of charge is effectually preheated before it reaches the zone of fusion between the electrodes. The latter are 24 inches apart. The crucible is lined with fire brick, and water-cooled. The metal tap hole is a water-cooled casting, but the slag hole is not cooled. Current is supplied by means of a 160-kilowatt, variable-voltage transformer, supplying from 16 to 96 volts, in 20 steps. The highest potential is used at starting. When running normally, the voltage is about 35, and the current 4,000 amperes. Up to the present time, six runs have been made, varying in length from 90 to 279 hours. The lowest figure for a run was 0.35 kilowatt-year per ton of pig. This includes the preheating of the crucible before any charge is put into it. This preheating of the crucible takes current for about 24 hours before smelting is commenced. This charge will become insignificant in a furnace which will run for three or six months without being shut down. Plans are now being drawn for a 1,500-kilowatt furnace similar to the one just described. This, however, will use three-phase current. Some of the problems presented in designing an electric smelting furnace are then discussed. The rate of heat production necessary to maintain a given temperature in the furnace depends upon the thickness and the conductivity of the walls. An analysis of furnaces which have been built up to this time shows a fair uniformity, which may be stated to be from 7 to 15 kilowatts per cubic foot of crucible. Sometimes it is difficult to determine just what constitutes the crucible. The lining must be adapted to the character of the ore, a basic brick being used with basic slag. The brick must be efficiently cooled, or it will not last for any length of time. Care must be taken in the arrangement of the water jackets, or electrical difficulties will be met. The bricks at high temperatures become good conductors of electricity. The power factor of the 160-kilowatt furnace just described was 95 per cent. A good deal, however, depends upon the layout of the bus bars carrying the large currents of the furnace. There is difficulty in securing electrodes which will stand the service. Those giving the most satisfaction have been manufactured by the Heroult process. They are usually 16 inches square and 6 feet long. An electric furnace can compete successfully with a blast furnace only where water power is cheap, and coal dear. Assuming a heating efficiency of 25 per cent for fuel, and 75 per cent for electric heating, then electricity is cheaper than coal only when one ton of coal costs more than half the cost of an electric horsepower-year. The author estimates that the running cost of a 1,500-kilowatt furnace, producing 15 tons a day, would be $204.60, or $13.64 per ton. Allowing $2.50 for incidentals brings the total cost to $16.14. The cost of energy is estimated at $5 for each ton produced. The consumption allowed for is 0.31 kilowatt-year per ton. The method of operating the furnace consists of first filling it to the top with previously heated coke, which is a conductor. By applying a low voltage, the temperature can be gradually increased. After 12 hours, the first charge is fed in, consisting of iron ore, lime and andesite. This is put in at the rate of a shovelful every four minutes, and after it is all in, the regular charge is commenced. It may consist of 1,000 pounds of iron ore, 253 pounds of charcoal, 100 pounds of lime and 160 pounds of andesite, which is fed in rapidly at first, so as to get a column of charge in the stack. After four hours, the furnace is tapped and a part of the iron drawn off. A proper amount of slag is maintained by drawing off occasionally from the slag tap hole.

Excited Market Follows Declines.

A series of declines ranging from ¼ to 3¾ marked the second week of the setback to the long continued rising market. Several railroad stocks led in the falling off, and were sympathetically followed by industrials. Monday the market opened dull and irregular, but closed higher on a rally. Irregularity marked Tuesday's transactions, the market being active. Weakness developed on Wednesday, together with activity; and on Thursday, the irregularity of the market was co-incident with the violent break in cotton to the lowest price of the year. A less active market on Friday was followed by a surprisingly active and excited market on Saturday. Sales for the two hours aggregated over a million shares, prices being subject to violent fluctuations.

Copper metal prices were lower in London the middle of the week and fairly steady in New York, this condition being reflected in prices of several of the copper stocks.

Call money was nominally easy at from ¾ to 1¼ during the week. Of course, this makes it easy for the large financial interests, which alone can avail themselves of this low rate, to carry their stocks in banks, thus expanding the banks' loan accounts which look well on paper. The surplus reserves of the New York clearing house banks increased $5,529,350, the total surplus now standing at $65,461,525, against $9,976,400 a year ago, and $4,290,075 two years ago. Loans decreased $7,244,700 and deposits decreased $724,100. The percentage of actual reserve was 29.88, an increase of 0.45. Non-member banks and trust companies showed loans increased $12,355,900; deposits increased $11,306,000, and the percentage of reserve 36.1, a decrease of 0.5 per cent. Commercial failures during the week in the United States were 239, compared with 248 the preceding week, and 173 the corresponding week last year. Bank clearings in New York for the week ending Aug. 20 aggregated $2,349,675, or 6.7 per cent under the previous week, and 9 per cent below the corresponding week last year. Outside of New York, the total was 4 per cent under last week and 12 per cent under that of the corresponding week last year.

The total shares dealt in on the stock exchange during the week was 4,629,900, compared with 4,816,402 the preceding week and 2,804,691 the corresponding week last year. Bonds, exclusive of government bonds were sold to the amount of $12,238,000, compared with $18,308,000 the preceding week, and $5,483,000 the corresponding week last year.

Copper Stocks.

New York.—Amalgamated Copper closed 78⅜, a net gain of 2¼.

Boston.—Butte Coalition closed 26⅝, a net loss of ⅜; Calumet & Arizona closed 1⅛, a net loss of 1; Calumet & Hecla closed 675, no change; North Butte Mining closed 82⅞, a net gain of 3⅛; Quincy Mining closed 94, no change.

Financial Notes.

North Butte Mining Co. declared a quarterly dividend of $1 a share, payable Sept. 26; Railway Steel Spring Co., the regular quarterly dividend of 1¾ per cent on preferred stock, payable Sept. 21; Calumet & Arizona Mining Co., the regular quarterly dividend of $1 a share, payable Sept. 1; Quincy Mining Co., the quarterly dividend of $1 a share, payable Sept. 14; National Lead Co., the regular quarterly dividend of 1¼ per cent on common stock, payable Oct. 1.

The reorganization committee of the Southern Steel Co. announces that its plan has been assented to by 90 per cent of the first mortgage bondholders, 85 per cent of the holders of collateral trust notes and 91 per cent of the general creditors. Nothing now stands in the way of reorganization except the formation of an underwriting syndicate to provide the company with $2,000,000 working capital.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Aug. 22	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	11⅞	− ⅜	Sept. 3	19,820 000			
Allis-Chalmers pr	34½	− ⅜		16.150,000	7 cum	1¾ Q.	Feb., 1904
American Can	6	− ⅛	Feb. 3	41.233.300			
Am. Can pr	60½	− ½		41,233,300	7 cum	1¾ Q.	July, 1908
Am. Car & Foundry	39¾	− ¾	June 25	30,000,000		¾ Q.	July, 1908
Am. Car & Fdy. pr	103	+1		30.000.000	7 n. c.	1¾ Q.	July, 1908
American Loc	55⅝	− ⅝	Oct. 20	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	107			25.000,000	7 cum	1¾ Q.	July, 1908
American Ship	49¼	+3⅛	Oct. 14	7 600,000	4	1 Q.	June, 1908
American Ship pr	100½			7,900,000	7 n. c.	1¾ Q.	July, 1908
Am. Steel Foundries ctfs	9		Oct. 6	15 810 000			
Am. Steel Foundries(new	36	− ⅛		17,340.000	6 cum	2¼	Aug., 1904
Barney & Smith	46		June 2	2.000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	102			2 500 000	6 cum	2 Q.	June, 1908
Bethlehem Steel	21½		April 7	14,862,000			
Bethlehem Steel pr	51⅜	+ ⅛		14 968 000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	34½	− ¾	March 17	45.000.000*	6	1½ S. A.	Aug., 1908
Cambria Iron	46			8,168,000*	4	2 S. A.	April, 1908
Chicago Pneumatic Tool	26¼	−3¾	Feb. 17	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	33		Oct. 19	34 235 500		3½	April, 1902
Crucible Steel	74	− ½	Oct. 21	24.578 400			
Crucible Steel pr	48	+ ¾		24,436.500	7 cum	1 Q.	Dec., 1907
Empire Steel	7		Feb. 26	1,254.770			
Empire Steel pr	48			2 500,000	6 cum	3 S. A.	July, 1908
Fay & Egan	100		Feb. 18	1,000,000	6	1½ Q.	May, 1908
Fay & Egan pr	110			1,000 000	7 cum	1¾ Q.	May, 1908
General Electric	143¾	+ ⅜	May 12	65,167,400	8	2 Q.	July, 1908
Harbison-Walker	12		Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	75			9.6 0,000	6 cum	1½ Q.	July 1908
International Pump	24½		June 2	17.787.300		1	April, 1905
International Pump pr	80	− ¼		13,835.000	6 cum	1½ Q.	Aug., 1908
Lackawanna Steel	35½		March 11	34,971.400			
Lake Sup. Corp	6	−1	Oct. 7	40,000,000			
New York Air Brake	74	−1½	June 18	8 012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	130		Feb. 5	8,000 000	6	1½ Q.	June, 1908
Niles-Bement-Pond pr	100			2.000,000	6 cum	1½ Q.	May, 1908
Otis Elevator Co	38	+3	March 16	6.156,600		1½ S. A.	April, 1908
Otis Elevator Co. pr	91	+1		5.449,500	6 n. c.	1½ Q.	July, 1908
Penn. Steel	60		May 11	10,770.000			
Penn. Steel pr	98			16,500 400	7 n. c.	3½ S. A.	May, 1908
Pittsburg Coal Co	11¼	−1¼	Feb. 10	28,853.400			Nov., 1906
Pittsburg Coal Co. pr	43	−3½		27,030.800	7 c.	1¾	April, 1905
Pressed Steel Car	33¾	− ¼	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	96			12.500,000	7 n. c.	1¾ Q.	Aug., 1908
Pullman	165½		Nov. 11	100 000,000	8	2 Q.	Aug., 1908
Railway Stl. Spring	42	−1⅜	March 5	13,500,000	4	2 S. A.	April, 1908
Railway Stl. Spring pr	100			13,500,000	7 cum	1¾ Q.	June, 1908
Rep. Iron & Steel	22¾	+ ¾	Oct. 21	27,191.000			
Rep. Iron & Steel pr	78	+1⅜		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	60½	−2¼	March 11	10,000,000	5	1 Q.	June, 1908
Sloss-Sheffield pr	101			6,700.000	7 n. c.	1¾ Q.	July, 1908
U. S. Pipe & Fdy	26	−1¼	June 24	12,500,000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr	76	−2		12 500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	45⅝	+1	April 20	508,302,500	2 n. c.	½ Q.	June, 1908
U. S. Steel pr	108	− ¼		360,281,100	7 cum	1¾ Q.	June, 1908
U. S. Steel 5'	100			463,798.000	5	5 A.	
Va. Iron, Coal & Coke	59	−2	Nov. 17	9.073 680			
Westinghouse Elec	72	+3¾	June 24	28 933.200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	109	− ½	Oct. 6	11,000,000*		2½ Q.	July, 1908

Par value of shares, $100, except those starred (*), $50

NEWS FROM MANY INDUSTRIES

New Buyers:—

H. B. and Flossie Watson have incorporated the Seattle Brass Co., Seattle, Wash., which has a capitalization of $5,500.

William, W. J. and James J. Kehoe, Savannah, Ga., have filed articles of incorporation for the Kehoe Iron Works, capitalized at $100,000.

The Miller Machine Co., Defiance, O., has been incorporated by M. E. Miller, F. G. Miller, E. W. Hoffman, W. S. Shelby and John C. Diehl. The company is capitalized at $10,000.

The Standard Smelting & Refining Co., Cleveland, has been incorporated with $10,000 capital by Nathan Komito, Max Stoller, Henry B. Stoller, John Bloomberg and Adolph Rigelhaupt.

The Perrin Plow & Stove Co., Ltd., Smiths' Falls, Ont., has been incorporated by Francis R. Oliver, Richard S. Harder, Barnabas Knapp and others, with an authorized capital of $200,000.

Harry F. Bigram, Harry E. Bruey, Roland C. Nusbaum, Ralph J. Ingold and C. Charles Schwingel have incorporated the Eagle Automatic Machine Co., Canton, O., capitalized at $10,000.

The Murchey Pipe Threading Machine Co., Toledo, O., capitalized at $50,000, has been incorporated by William Murchey, William D. Wilcox, N. G. Carney, G. M. Hannon and Frank H. Gear.

A charter has been granted to the Belle City Steel Casting Co., Racine, Wis., which has an authorized capital of $4,000. Those interested are: J. D. Dwight, M. J. Goepperil and W. C. McMahon.

A charter has been issued to the Canadian Brass Co., Ltd., Galt, Ont., capitalized at $100,000, with Edwin J. Gerry, Frank S. Scott and Harvey Leddon as provisional directors.

The New York Steel Beam & Girder Co., New York City, has been incorporated with $100,000 capital to manufacture and handle steel beams, girders, etc. The incorporators are: Charles M. Grey, East Orange; Dix W. Neel and William B. Davis, No. 1 Broadway, New York City.

The Murchie Iron Collar Co., Appleton, Wis., has filed articles of incorporation. The company is capitalized at $25,000, and will erect a plant at Appleton Wis., to manufacture the Murchie iron setscrewless collar, for use in paper mills, and a number of other patented articles. The incorporators are: F. T. Murchie, Charles Baker and Nicholas Herrmann Jr.

The Meech Foundry Co., Cleveland, has been granted a charter. The capital stock of the company is $10,000, and the incorporators, Edward E. Hoffman, Joseph Hubal, James Rotta, George Kling and Anton Ceruz.

The Commercial Dairy Machinery Co., Cleveland, O., has been granted a charter through William C. Trapp, R. M. Calfee, A. C. Riddle, E. R. Poulson and J. H. Farnsworth. The capital stock of the company is $25,000.

The Sargent-Hollingshead Co., 107 Dearborn street, Chicago, has been incorporated to manufacture railway equipment, with $5,000 capital stock. The incorporators are: George H. Sargent, Arthur G. Hollingshead and William C. Boyden.

The Lister Noble Roller Co., Boston, machinery, has been incorporated with $50,000 capital stock. The officers named in the charter are: President, John R. Milson, Watertown; treasurer, Warren Stetson, Savin Hill; clerk, James F. Keneson, Auburndale, Mass.

The White Boiler-Feed Regulator Co., New York City, has been incorporated to manufacture boiler-feed regulators, etc., with $25,000 capital stock. The charter members of the company are: H. M. Browne, F. W. Mills, E. J. Forhan, 154 Nassau street, New York City.

Articles of incorporation have been filed by the Glanz Heineke Ornamental Iron Works, 100 Washington street, Chicago, to manufacture iron work. The capital stock of the company is $6,000, and the incorporators are: F. Z. Marx, E. M. Kinn and C. H. Harvard.

O. J. Mousette Co., Brooklyn, N. Y., has been incorporated to manufacture tools, dies, ore crushers and special machinery, with $20,000 capital stock. The incorporators are Oliver J. Mousette, Charles J. Mousette, 852 Hancock street, Brooklyn, and William Melvin, 125 State street, Perth Amboy, N. J.

The Reid-Edelmuth Mfg. Co., Brooklyn, N. Y., has been incorporated to manufacture and deal in hardware and hardware supplies, with $5,000 capital. The incorporators are: Louis Edelmuth, 500 West 159th street, New York; Thomas A. Reid, 884 Seventieth street, W. C. Roberts Hersfield, 17 Ninth street, both of Brooklyn.

New Construction:—

The Columbia Steel Co. has begun work on a proposed 700-foot dock, near Linton, Ore.

The Beaver Dam Malleable Iron Co., Beaver Dam, Wis., is erecting a large office building at a cost of $15,000.

The Poughkeepsie Foundry & Machine Co., Poughkeepsie, N. Y., is building an addition in the shape of a core room.

The Pacific Malleable Castings Co., Riverside, Cal., has taken out a building permit for two 2-story foundry buildings with a total valuation of $25,000.

Extensive operations are under way in preparation for large additions which are to be erected at the plant of the Pressed Steel Tank Co., Milwaukee, at West Allis, a suburb.

The Michigan Pipe Co., Bay City, Mich., is rebuilding its plant recently damaged seriously by fire, and has made all arrangements for the new building.

The Terry Steam Turbine Co., Hartford, Conn., is having plans drawn for a new factory, which will be of brick, one story, 80 x 200 feet. A power plant will also be erected.

The Utah Mining Machinery & Supply Co., Salt Lake City, Utah, has taken out a permit to build a $15,000 building at 161-3 Pierpont street, two stories, steel and cement.

The National Metal Molding Co. has decided to enlarge its factory at Economy, Pa. The contract for the structural steel work has been awarded to Wm. B. Scaife & Sons Co., Pittsburg.

The John Deere Plow Co. has let contracts for the completion of a warehouse in course of construction at Omaha, Neb., nine stories, 132 x 284 feet, of reinforced concrete construction and costing $450,000.

The Western Electric Co., 359 South Clinton street, Chicago, has let contracts for the construction of a five-story fireproof factory to be built in connection with a plant at Hawthorne, Ill., to cost $400,000.

The Philips Pressed Steel Pulley Works, Philadelphia, manufacturer of pressed steel pulleys, is erecting a factory at Fourth street and Glen-

wood avenue for the purpose of manufacturing pressed steel pulleys in sizes from 36 inches to 48 inches in diameter. The factory will be two stories, 70 x 125 feet. After the special machinery, now being completed, is installed in this new building, the company will be enabled to turn out from 400 to 500 pulleys per day.

The Titusville Iron Co., Titusville, Pa., of which J. C. McKinney is president, has begun work on improvements which will include a boiler shop, machine shop and foundry.

The El Paso Foundry & Machinery Co., El Paso, Tex., has awarded the contract to the Allis-Chalmers Co. for a Corliss engine unit and full complement for electrical generators, exciters, etc.

The Atchison, Topeka & Santa Fe railway is erecting a machine shop in Argentine, Mo., yards to replace the shops burned about a year ago. The building will be one story and will cost about $50,000.

The Mesta Machine Co., Pittsburg, recently closed a contract with the Sweet Steel Co., Williamsport, Pa., for a 16-inch re-rolling rail mill, consisting of one stand of cast steel machine molded pinions and two stands of rolls.

The Marion Steam Shovel Co., Marion, O., has awarded the McClintic-Marshall Construction Co. the contract for 600 tons of structural steel to be used in building an addition to the Marion plant, 100 x 350 feet.

The Wilcomb Machine Co., Norristown, Pa., has let the contract for an addition to its present plant. The new building will be equipped with $50,000 worth of machinery, to be employed in the construction of knitting machinery.

The Hynson Tool & Supply Co., St. Louis, has purchased the property at 4756-58-60 Easton avenue, and will remove there Sept. 1. When alterations to cost about $2,000 are made, the building will be 40 x 80 feet, three stories.

The new plant of The Schaefer Co., at Berlin, Wis., including a large foundry, machine shop, engine house and office, is nearly completed. The Schaefer Co. will engage in the manufacture of marine engines and will carry on a general foundry and shop work.

The Keefer Hunt Iron & Steel Co., Alexandria, Ind., builder of hollow steel wheels, is working steadily toward the completion of the foundry addition to the old site, 60 x 250 feet, with concrete floor and saw-tooth roof. Machinery is being installed in the new addition.

The Cleveland Foundry Co., Platt avenue S. E. and the C. & P. tracks, is having plans drawn by the Osborn Engineering Co., Cleveland, for a factory building five stories with basement, 60 x 200 feet, of heavy mill construction. Bids will be asked this week.

General Industrial:—

The Vacuum Cotton Picking Machine Co., St. Louis, Mo., has increased its capital stock from $750,000 to $3,000,000.

Charles Buran and J. C. Manson, of Hamilton, O., are organizing a company at Jonesboro, Ark., to manufacture boilers in that city. The company is capitalized at $10,000.

The Parkersburg Machine Co. was the successful bidder for the plant of the United States Engine Works, Parkersburg, W. Va., at public auction, the purchase price being $20,000.

The Midvale Steel Co., Midvale, Pa., notified a large percentage of employes now idle to report for duty Monday. The company is said to have received several large foreign orders.

James C. Little, a Pittsburg chain making expert, will be the manager of a chain works which is being started in Johnstown, Pa. Machinery is being installed in the plant, and operating will begin within a few weeks.

The Cambria Steel Co. has gradually increased its working force each week since the beginning of the current month, and by Sept. 1 it is expected that over 60 per cent of the force will be employed.

Carl H. Hunter, receiver of the Nutting Machine Co., Cincinnati, O., has filed his first report, showing total receipts of $16,217.04, and disbursements exceeding $13,000. Authority is sought to pay the dividend upon certain claims.

The Marion Gray Iron Foundry, Marion, Ind., has secured a building for the extension of the foundry in order to carry out its plans for doubling its capacity made necessary by increased business, following a rush of orders.

An automatic fire protection system of 2,000 sprinkling heads fed from a 40,000-gallon wooden and metal tank raised 100 feet over the buildings, is being installed at the Lloyd Booth department at Youngstown, O., of the United Engineering & Foundry Co.

The Moline Malleable Iron Co., St. Charles, Ill., is erecting a swimming pool and shower bath house for the free use of the employes, 30 x 30 feet, of cement blocks with Georgia pine trimmings. The pool is 6 feet deep and of solid cement.

The Whitman Barnes Mfg. Co., St. Catharines, Ont., which was recently burned out and has been considering inducements offered to remove its plant elsewhere, has decided to remain in St. Catharines, the city having granted it exemption from taxation for 10 years.

The Burdict Bolt & Nut Machinery Co., Buffalo, N. Y., advises that the part of the Howard Iron Works, Buffalo, founders and machinists, pertaining to bolt and nut machinery is included in the new corporation, the Burdict company, and that no changes are contemplated or necessary.

Extensive improvements are being made at the plant of the Union Malleable Iron Co., Moline, Ill., preparatory to the third furnace being placed in operation. The shops are being equipped with a shop track and dump cars, doing away with wheelbarrow work. A power truck, driven by compressed air is being installed at the annealing shop.

The Franklin Stove Co., Columbus, recently incorporated to take over the business conducted by J. W. Hastings, has organized by electing these officers: President, F. M. Habercorn; vice president and manager, J. W. Hastings; secretary, C. A. Evans; treasurer, P. C. Carroll, who with Barbara Habercorn comprise the board of directors.

W. Ames & Co., Jersey City, N. J., bar iron, track bolts, railroad spikes, etc., advise relative to the recent incorporation of the company that they do not contemplate any extensive new construction at this time, but will continue manufacturing to the same extent and under the same name as formerly.

Vermilye & Power, 50 Church street, New York City, were low bidders on 50 6-yard dump cars for the Isthmian Canal Commission, their figure being $23,250. The H. K. Porter Co., Pittsburg, was low on 10 40-ton locomotives, $59,450. Bids were opened Aug. 13, there being 17 tenders.

The Pioneer Iron Works, which has been conducted for some years at Antigo, Wis., has been incorporated with a capital stock of $20,000 and is now known as the Pioneer Iron Works Co. Officers of the new company are: President, W. S. Morgan; vice president, E. F. Horn; treas-

urer, O. P. Walch; secretary and manager, M. L. Meyer. Mr. Meyer, the new manager, was formerly with the Allis-Chalmers Co. of Milwaukee.

The European Churchward Steel Co., recently incorporated, advises that it has been organized under New Jersey laws more especially to transact business in Europe, and has no present intention of domesticating a manufacturing plant in the United States.

The two lowest bidders for furnishing a 100-ton floating derrick at the Bremerton, Wash., navy yard were the Variety Iron & Steel Works, Cleveland, $167,700, and the Wellman-Seaver-Morgan Co., Cleveland, at $164,000.

The Automatic Machine Co., Bridgeport, Conn., manufacturer of automatic screw lathes, marine gasoline engines, etc., has been reorganized and new capital brought into the enterprise, making the capital stock now $400,000. These officers have been elected: President, Frank J. Kingsbury Jr.; vice president, James Coulter; secretary, Stiles E. Goodsell, and treasurer and general manager, Norman Leeds. Sidney Bishop, who held the controlling interest in the company, has disposed of his stock. The announced purpose of the reorganization is to provide additional capital to carry out plans for the extension of business.

The Keystone Steel & Wire Co., Bartonville, Ill., at a recent annual meeting of the stockholders, presented a very satisfactory report, showing that the company at present employs over 350 men, with day and night shifts. Over 50,000 tons of material have been manufactured and over $1,500,000 of business done in the past year. The following officers and directors were elected: President, P. W. Sommer; vice president, Peter Sommer; secretary, B. L. Sommer; treasurer, G. H. Schwaubacher; sales manager, W. C. Collins. Advisory board: J. W. Ward, William Bittle, E. H. Walker, D. F. Velde and Charles Duisdieker.

Fires:—

The Santa Fe railroad shops at Cleburne, Tex., were seriously damaged by fire Aug. 11.

The plant of the Indiana Rolling Mill Co., New Castle, Ind., was damaged to the extent of $25,000, Aug. 20.

The repair shops of the Wheeling & Lake Erie railroad at Norwalk, O., were seriously damaged Aug. 23. The buildings burned included the blacksmith, machine, boiler and carpenter shops, power house, storehouse and offices. Ten locomotives that were being repaired were damaged about $2,500 each. The property loss is placed at $300,000, covered by about $95,000 insurance.

The roof of the boiler house of the Central foundry, Vincennes, Ind., was burned off Aug. 7. The plant was not seriously damaged.

The foundry and machine shop of H. Humphrey & Sons, Joliet, Ill., escaped serious damage Aug. 12 by the quick work of the firemen. The loss was nominal.

A spill of metal from the cupola started a fire at the plant of the Standard Car Wheel Co., Cleveland, Aug. 21. It was extinguished before much damage was done.

Trade Notes:—

The Independent Pneumatic Tool Co., Chicago, has appointed the well known firm of H. W. Petrie, Ltd., 131 Front street west, Toronto, and 22 Victoria square, Montreal and Vancouver, B. C., as exclusive agents for the sale of the Thor pneumatic tools and appliances in the Dominion of Canada. The company mentioned will carry a complete line of Thor pneumatic tools and appliances in its various stores, and will therefore be able to make immediate delivery.

Two orders for Koerting patent oil firing system have lately been booked by the Schutte & Koerting Co., Philadelphia, for equipping the new battleships, North Dakota, being built by the Fore River Ship Building Co., and Delaware, being built by the Newport News Ship Building Co. This system is in successful use in the English and German navies, the new English Dreadnaught class being equipped with it. Catalog 6-O giving full description of this system can be obtained from the manufacturer.

TRADE PUBLICATIONS.

BOLT CUTTERS.—Landis bolt cutters are described in a new 40-page catalog, 6 x 9 inches, just issued by the Landis Machine Co., Waynesboro, Pa. The catalog presents facts regarding the Landis chasing dies and gives a description of the Landis all-steel die head. The chasers used are all milled instead of being hobbed and will interchange perfectly, and no lead screw is required in a Landis machine in connection with these dies. The catalog describes 14 different sizes and types of bolt and stay-bolt cutters ranging from a 1-inch single head machine to a 2-inch triple machine. It also presents some tables for use in connection with the operation of this machine.

FEED WATER HEATERS.—The Harrison Safety Boiler Works, Philadelphia, is issuing a small booklet entitled "A Few Coal Facts," stating the advantages of the Cochrane feed water heater under the heading "Six boilers can make more steam than seven," provided they are used in connection with a feed water heater. The booklet describes the construction and operation of the heater, and shows its installation in a number of collieries.

GRAPHITE.—The Jos. Dixon Crucible Co., Jersey City, is distributing a 12-page booklet relative to Dixon's Ticonderoga flake graphite. It takes up the forms of graphite, discusses graphite as a lubricant and presents the results of tests.

SPIRAL PIPING.—The American Spiral Pipe Works, Chicago, in pamphlet No. 22, presents and illustrates the installations of Taylor's spiral riveted pipe. The illustrations are drawn principally from pressure lines for use in electric power and mining installations.

CONVEYING AND TRANSMISSION MACHINERY.—The H. W. Caldwell & Son Co., Chicago, is issuing a 30-page booklet describing the transmission and conveying machinery installed by it in the Hecker-Jones-Jewell mill in New York. The transmission machinery is principally rope drives and the conveying machinery comprises barrel elevators, spiral lowering chutes, screw conveyors, etc. The form in which the booklet is gotten up is unique, there being very little descriptive matter, but a great number of photographs of machinery installed.

PORTABLE ELECTRICAL TOOLS.—The United States Electrical Tool Co., Cincinnati, is distributing catalog E, describing a line of portable electrically-driven tools, among which may be mentioned drills, both of the breast and bench radial type, and grinders for hand, lathe and bench work. The catalog comprises 52 pages, and in addition to the tools listed, contains a number of testimonials.

ALUNDUM.—The Norton Co., Worcester, Mass., is distributing a 20-page booklet describing the manufacture of alundum, the raw material entering into the manufacture of grinding wheels made by this concern. This product is made in the electric furnace, the raw material being bauxite, which chemically is aluminum oxide. It is first washed, calcined and then fused in an electric furnace at Niagara Falls, N. Y., after which it is crushed and shipped for the manufacture of grinding wheels. The booklet describes the process in great detail, and also contains a discussion on the selection of grinding wheels and the qualities essential for the most efficient work in connection with materials of varying character.

JACKS.—"Simplex" car and track jacks are described in a 32-page booklet issued by Templeton, Kenly & Co., Ltd., 18 Sloan street, Chicago. The jacks described are single and double acting, automatic in lowering and operative at any angle. The range of capacity is from 10 tons to 35 tons.

SWING SAWS.—The Carse Brothers Co., 165 Broadway, New York, is issuing bulletin No. 101, describing the Reliance electrically-driven swing saw. These saws are made in sizes from 16 to 32 inches diameter, and are designed to combine simplicity with great strength and rigidity. The saw can be mounted either on the ceiling or on a side wall, or can be supported on standards attached to a bench.

INDUSTRIAL RAILWAYS.—Ernst Wiener Co., 66 Broad street, New York, is issuing a folder calling attention to its industrial railway equipment. The folder illustrates flat platform cars, portable track equipment and steel double side dump cars. This material, together with other equipment, is more fully described in catalog 117, which will be sent on request.